First Copy

GRAW-HILL
BLICATION

TECHNOLOGY DEPA

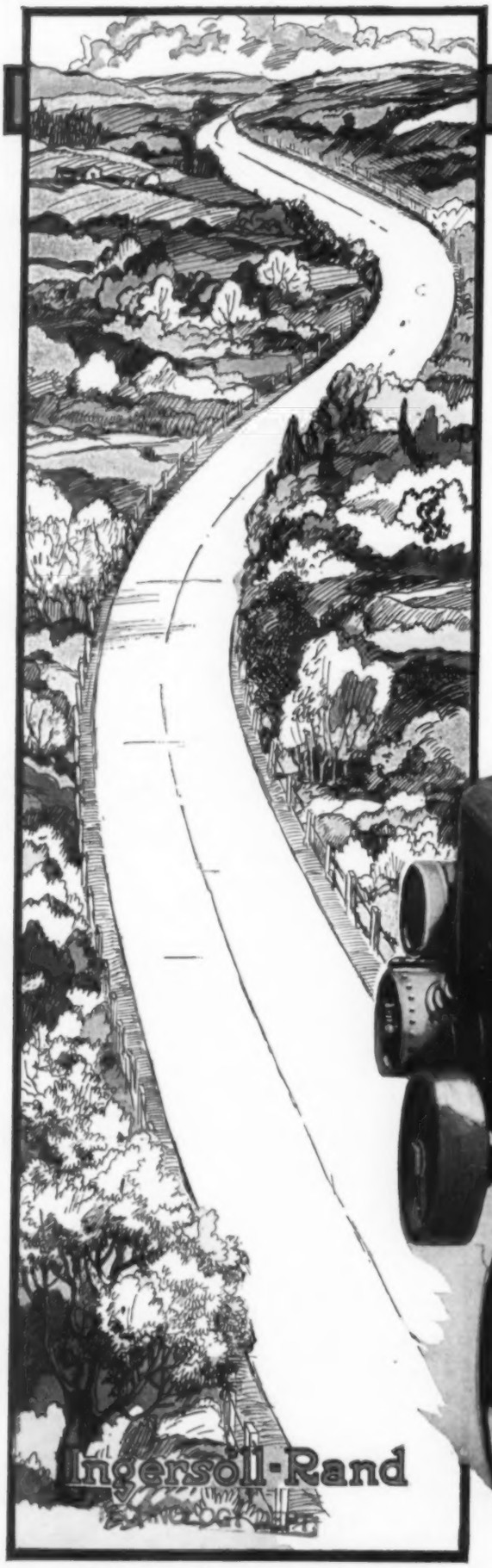
PUBLIC LIBRARY
MAR 10 1930
DETROIT

March
1930

Construction Methods

Plant for Lapped
Slab Revetment
ississippi River

MON
Highway
Industrial



Portable Compressors and Modern Road Building

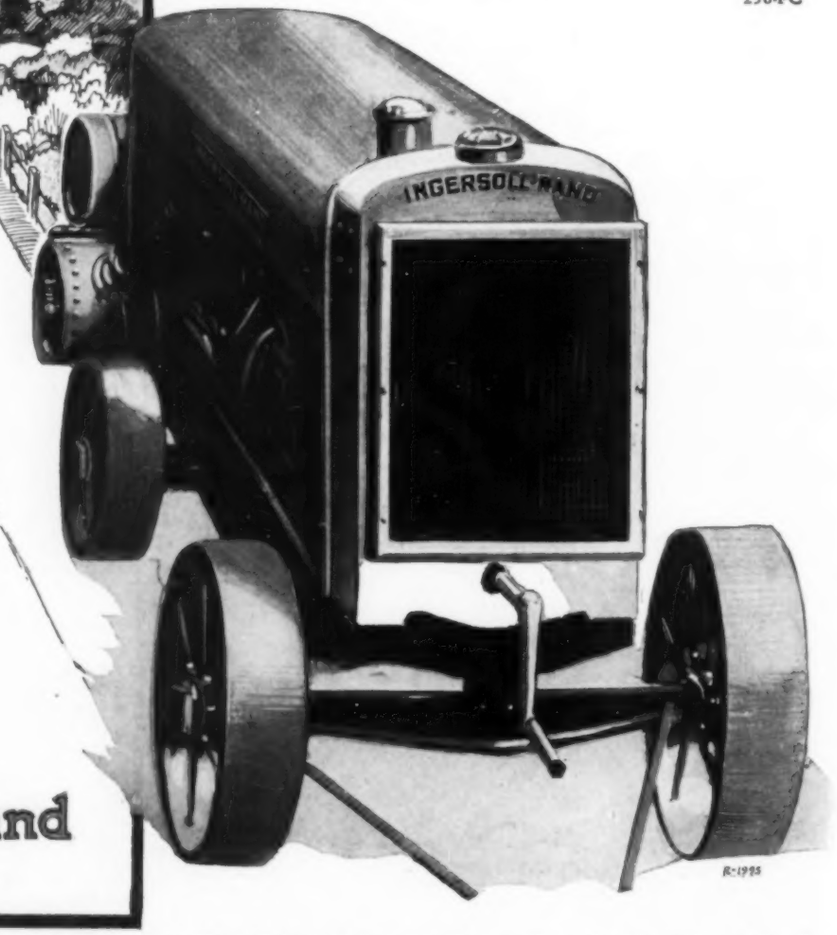
The unparalleled spread of our highway systems, even to remote and mountainous sections of the country, has frequently been hastened by the portable compressor and modern rock drill. Ingersoll-Rand compressors, "Jackhamer" drills, and labor-saving tools have played a prominent part in this nation-wide program of expansion.

INGERSOLL-RAND CO., 11 Broadway, New York

Branches or distributors in principal cities the world over

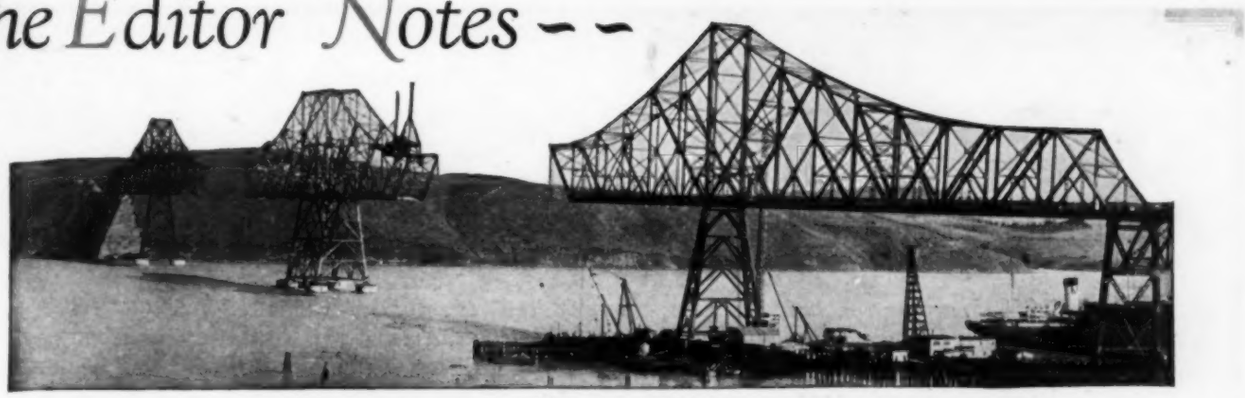
For Canada Refer—Canadian Ingersoll-Rand Co., Limited
10 Phillips Square, Montreal, Quebec

236-PC



CONSTRUCTION METHODS, March, 1930. Vol. 12, No. 3. Published monthly. McGraw-Hill Publishing Company, Inc., Tenth Avenue at Thirty-sixth Street, New York, N. Y. $1 per year; per copy, 10 cents. Entered as second-class matter, October, 1926 issue, Vol. 8, No. 10, at the Post Office at New York, N. Y., under the Act of March 5, 1879. Printed in U. S. A.

The Editor Notes - -



A Theory That Needs Revision

ONE reason to account for the disruptive influence of the irresponsible bidder in the construction industries is found in the theory that generally governs the purchase of construction services. This theory, as outlined by Col. Willard Chevalier, publishing director of *Construction Methods* in an address before the recent annual convention at New Orleans of the Associated General Contractors, assumes that it is possible for an engineer or an architect to describe the nature and quality of his proposed structure through plans and specifications with so nice a precision and then maintain an inspection of such thoroughness that he can get exactly what he wants from any constructor that may happen to submit a bid. It is in deference to this theory that so many individuals responsible for the award of contracts have developed the blind worship of the low bid and have fostered the notion that the constructor has nothing to sell but the price. Of late, however, an increasingly large group of engineers and architects recognize that they cannot define skill, integrity and responsibility in their blueprints and specifications and that no amount of practicable inspection can get a satisfactory result from an irresponsible, unskilled, dishonest or underpaid contractor.

Calcium Chloride in a New Role

Announcement of a new use for calcium chloride in connection with state highway department work in winter comes from Pennsylvania. Cinders, before they are spread on icy roads to prevent the skidding of motor vehicles at curves, grades and railway crossing, are sprayed with a solution of calcium chloride. The thawing properties of the chemical cause the cinders to penetrate and imbed themselves in the ice, making a permanent tractive surface as long as the ice sheet remains. Cinders without the chemical, according to W. A. Van Duzer, assistant chief engineer, were found to scatter with the passing of vehicles or slide with the wheels when brakes were applied and required replacement as often as three times a day. The chemical treatment of the cinders is another example of laboratory studies put to practical use.

CONSTRUCTION METHODS

A monthly review of modern construction practice and equipment

ROBERT K. TOMLIN, *Editor*

Editorial Staff

VINCENT B. SMITH NELLE FITZGERALD

J. I. BALLARD (San Francisco)

WILLARD CHEVALIER, *Publishing Director*

A McGraw-Hill Publication

Tenth Avenue at 36th Street, New York

Arc Welding for Tall Buildings

Two large office buildings, one on the west and the other on the east coast, are soon to be erected with the assistance of electric arc welding. A 13-story structure, almost entirely electelectrically welded, is to be erected for the Southern California Edison Company in Los Angeles, and a 14-story structure, also electrically field welded, is planned by the Boston Edison Company. To date electric arc welding in the structural field has been applied largely to industrial buildings, among the largest projects being the factory in West Philadelphia owned by the General Electric Company and described in this journal May, 1928. The tall new structures proposed for California and Massachusetts, therefore, mark an important extension of electric welding into the field of commercial buildings.

Another application of structural welding will be made in building a new $1,500,000 city hall at Schenectady.

It's Not The "Breaks"

AS AN explanation for differences in production on road-building contracts of comparable size and type contractors on the low production jobs too often take refuge in the overworked alibi, "It's the breaks," to account for the greater output of their competitors. That consistently rapid progress has something more behind it than lucky "breaks" was emphasized by P. M. Tebbs, assistant chief engineer of the Pennsylvania Highway Department, in an address before the recent convention of the American Association of State Highway officials. Last year there were in operation in Pennsylvania 60 paving mixers producing, on the average 20 miles per week or ½ mile per week per paver. Some contracts were producing a mile per week and others only a few hundred feet.

Not one of the poor producers, Mr. Tebbs stated, would admit that he had a poor organization or that his organization was poorly managed. Very few of them would accept time-saving suggestions in use on good producing jobs and still fewer would visit the high production jobs and learn the reason for this production.

Real contractors are devoting time and study to the saving of minutes and even seconds while the poor ones are still talking in days, weeks and months. This attitude of complacency in the face of poor progress records needs a jolt. The contractor who refuses to profit by the experience of others won't be in business long.

Misguided Safety

Safety enthusiasm can be carried to unreasonable limits. A contractor tells about one misguided safety engineer who ordered steel workers to wear goggles when drifting beams. This equipment blocked one man's side vision and a beam being swung into place scooped him from his perch on the steel work.

To Keep Abreast of the Need

NOT long ago a manufacturer of construction equipment, in discussing his operations, said to us, "We have in hand the most extensive engineering program ever faced by this organization."

Now just what does that mean to a manufacturer?

First, it means that he must have his men constantly out in the field to absorb first-hand and practical knowledge of what the constructor most needs in his work.

Then he must keep up with the findings of the scientists who are seeking out in their laboratories the latest in materials and power for him to apply to practical use.

Next comes the stage of design, with engineers and draftsmen putting into their specifications and blueprints all that their experience and skill can suggest to improve the operating efficiency of the product.

When these are ready, there comes the period of investment in the new patterns, jigs, dies and tools required for the new model.

And eventually, the first machine is built. But even this often is but a beginning—an experiment to be tried out under operating conditions before the new model may be released to the field. Finally, after all this, it may be necessary to reorganize and re-tool the factory to put it on a production basis and to write off a heavy investment in tools, patterns, dies, jigs and other fixtures that may have become obsolete with the passing of the old design.

A costly and trying process indeed, but this is a snap-shot of what lies back of the manufacturer's "extensive engineering program." And something of this sort lies back of every announcement of new or improved equipment carried in the advertising pages of *Construction Methods*.

Modern construction progress is achieved only through such constant effort on the part of the manufacturer to see that the constructor has always at his service equipment that will be in keeping with the growing size and complexity of the problems that confront him.

Willard Chevalier

Publishing Director

McGRAW-HILL PUBLISHING COMPANY, INC., TENTH AVENUE AT 36TH STREET, NEW YORK, N. Y.

CABLE ADDRESS: "MACHINIST, N. Y."

JAMES H. McGRAW, *Chairman of the Board*
MALCOLM MUIR, *President*
JAMES H. McGRAW, JR., *Vice-Pres. and Treas.*
EDWARD J. MEHREN, *Vice-President*
MASON BRITTON, *Vice-President*
EDGAR KOBAK, *Vice-President*
HAROLD W. McGRAW, *Vice-President*
H. C. PARMELEE, *Editorial Director*
C. H. THOMPSON, *Secretary*

Member A.B.C.
Member A.B.P.

NEW YORK *District Office, 285 Madison Avenue*
BOSTON, *1427 Statler Building*
WASHINGTON, *National Press Building*
CHICAGO, *520 North Michigan Avenue*
PHILADELPHIA, *1600 Arch Street*
DETROIT, *2-257 General Motors Building*
CLEVELAND, *Guardian Building*
GREENVILLE, S. C., *1303 Woodside Building*
ST. LOUIS, *Bell Telephone Building*
SAN FRANCISCO, *883 Mission Street*
LOS ANGELES, *632 Chamber of Commerce Bldg.*
LONDON, *6 Bouverie Street, London, E. C. 4*

Copyright, 1930, by McGraw-Hill Publishing Company, Inc.

LE ROI GIVES NON-STOP POWER to the job!

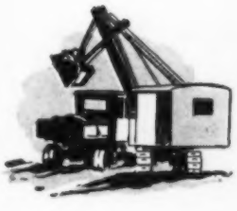
AIRPLANES dart their way along sky routes — skyscrapers nose their towers into the clouds — people span the continent in 48 hours — it's a new era and a new demand on *power.*

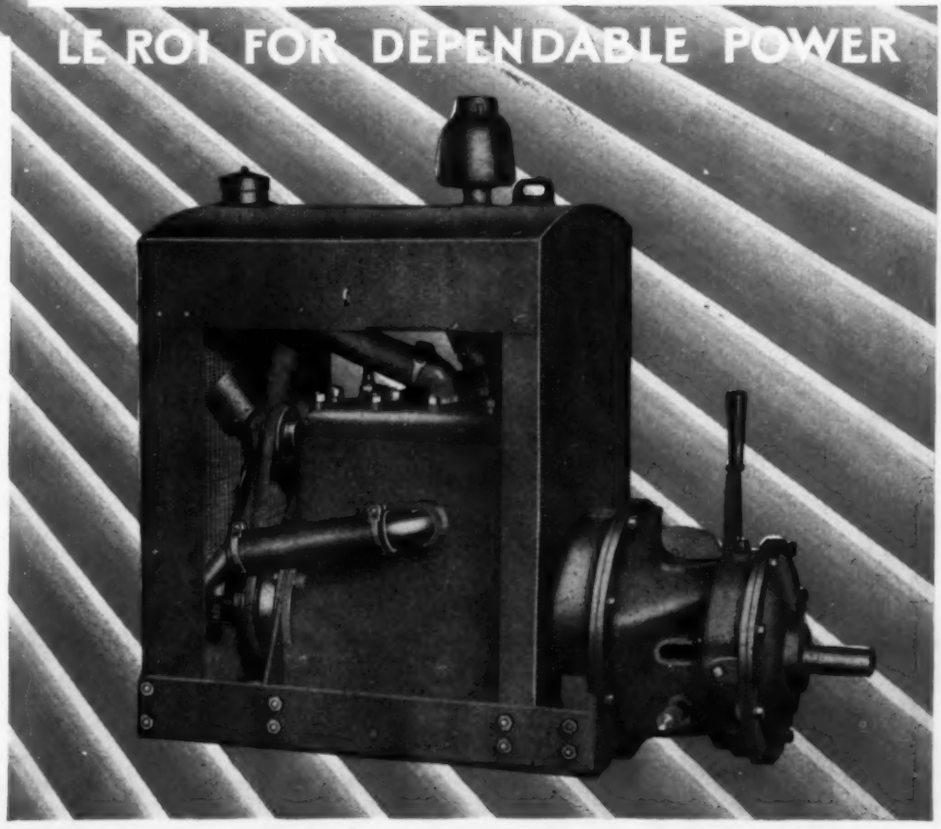
Le Roi Engines are built for the new order of things — to deliver dependable, non-stop power, to furnish the maximum rated horsepower under full load—to perform at top speed at the lowest operating costs.

Naturally, the Le Roi is an engine that is right in design and sound in construction — one that is formed from quality materials and assembled under the most painstaking supervision. And of all this, the gratifying result is reflected in Le Roi's unparalleled field performance.

Look to Le Roi for Dependable Power.

LE ROI COMPANY, Milwaukee, Wisconsin





LE ROI ENGINES

Both are Autocars. One is many years old, and by its faithful performance, responsible for the presence of the other as its running mate. Together they compose the Neversink Slag Co. fleet. The newer model is a 3-ton, 6-cylinder SCH with Heil 2-yard dump body.

"STRONG, DURABLE AUTOCAR TRUCKS"

Down into the slag quarry, up and across country to the paving job, . . . that is the daily routine of the capable Autocar pair owned by the Neversink Slag Company, Reading, Pa. Neversink Slag has long been a factor in concrete highway and paving construction in the Reading area. » » » Representative of owner good will toward Autocars is the following, quoted from a recent letter of W. R. Dowd, Proprietor of the Neversink Slag Company to Autocar's Direct Factory Branch at Reading:

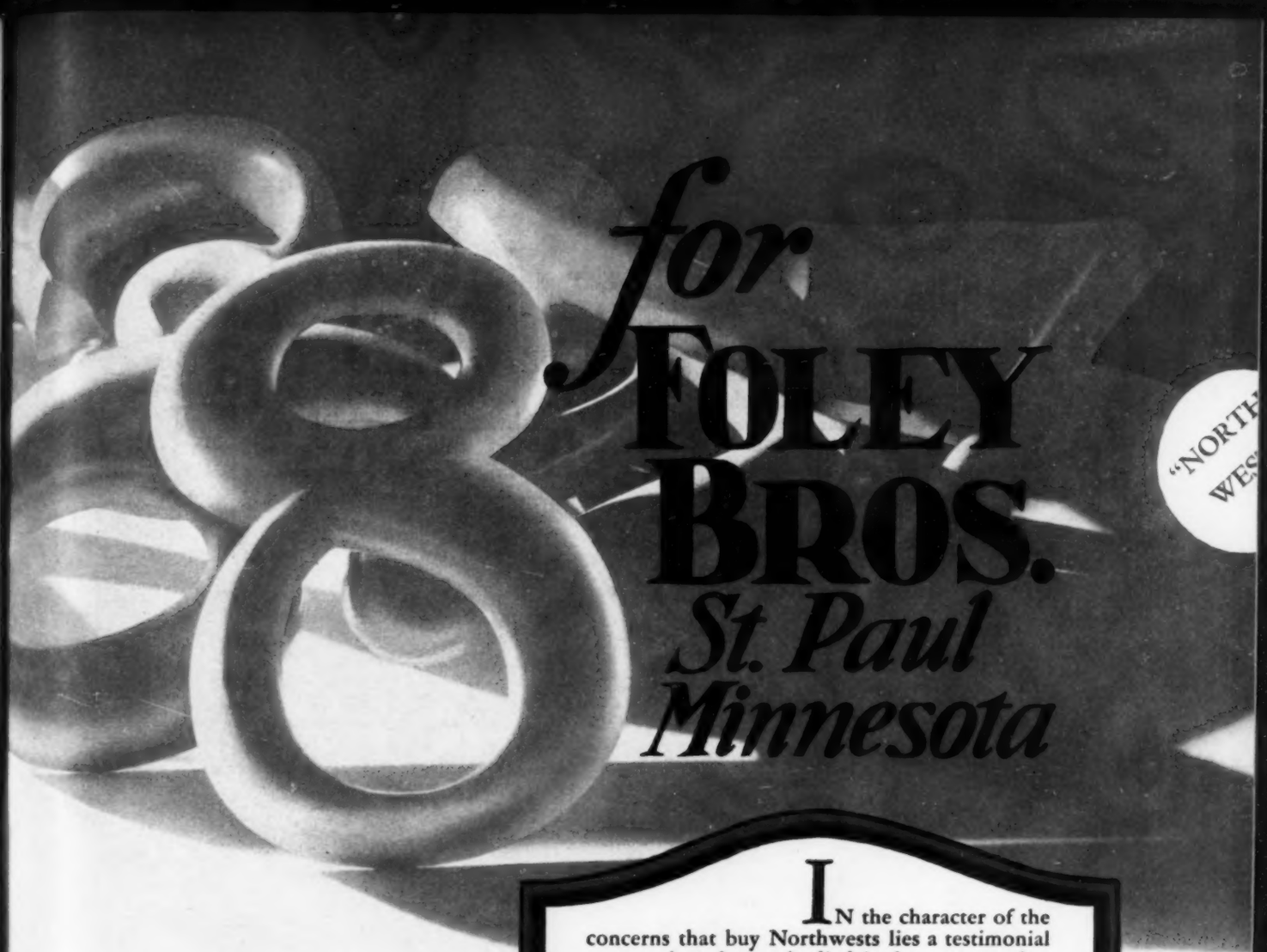
"When we receive an order for slag in our city we are able to make record delivery by means of our two strong durable Autocar Trucks. We have had one of them for the past several years and the other is one of the new six-cylinder models. Both are doing good service and we like them very well."

Write today for the Autocar Construction Book.

PRECISION BUILT

AUTOCAR TRUCKS

The AUTOCAR Company, Ardmore, Pa., Established 1897



IN the character of the concerns that buy Northwests lies a testimonial greater than that embodied in the mere number of machines that they own.

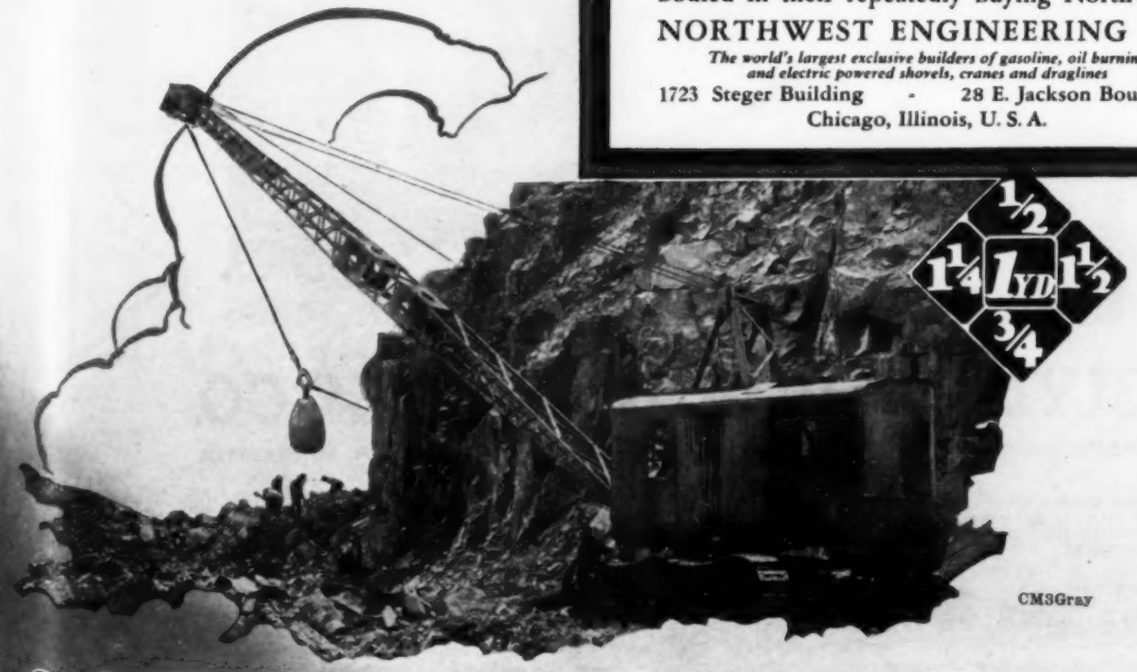
Such a firm as Foley Brothers of St. Paul, Minn., successful, known throughout the country, have to have the best!

You can't afford to overlook the testimonial embodied in their repeatedly buying Northwests.

NORTHWEST ENGINEERING CO.

The world's largest exclusive builders of gasoline, oil burning and electric powered shovels, cranes and draglines

1723 Steger Building - 28 E. Jackson Boulevard
Chicago, Illinois, U. S. A.



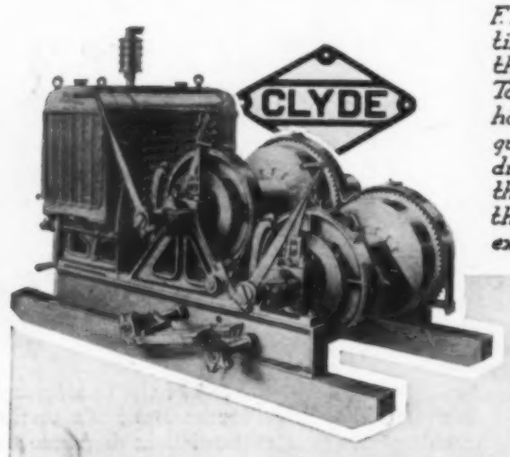
CM3Gray

NORTHWEST

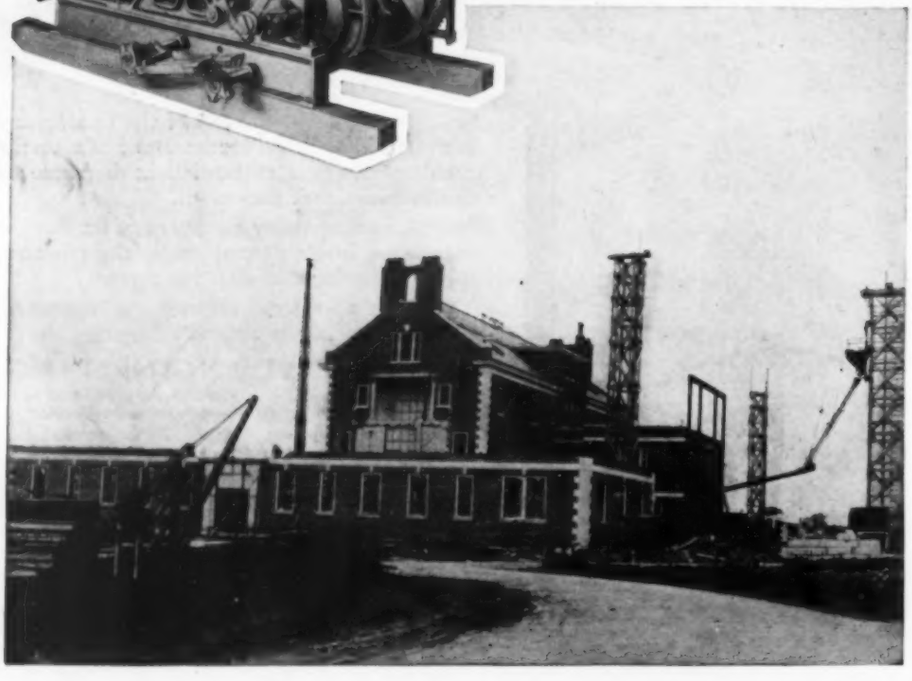
CLYDE HOISTS-DERRICKS

finished in record time

Sweet words to the contractor who can say that about his latest job - for that means that the entire operation must go along without a hitch - no delays - no hoist failures. On any job - big or small - success or failure hinges on the performance of the hoist. All Clyde hoists are designed and built for performance and service, and the constant repeat orders from satisfied owners prove their dependability and efficiency



F.M. Spencer & Son finished in record time, the $375,000.00 building for the Security Benefit Association at Topeka, Kansas. Two Clyde gasoline hoists were used - one to operate the guy derrick, - the other with a third drum extension added, operated the three towers as shown. Throughout the entire operation both hoists gave exceptionally fine performance.



CLYDE IRON WORKS SALES CO.

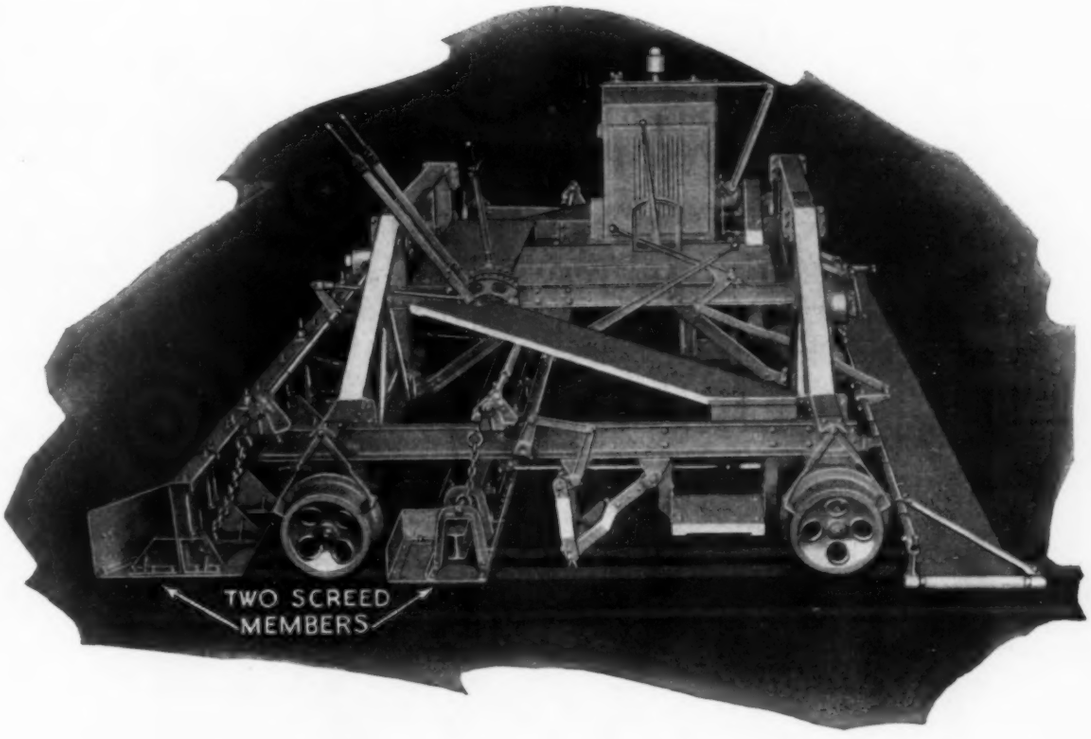
DISTRIBUTORS FOR CLYDE IRON WORKS DULUTH, MINNESOTA

—BRANCHES—

NEW ORLEANS: 309 MAGAZINE ST.
PORTLAND, OREGON: 555 THURMAN ST.
SEATTLE: 3410 FIRST AVENUE SOUTH
CHICAGO: 11 SO. LASALLE STREET
MEMPHIS: 69 UNION AVENUE
NEW YORK: 856 EAST 136TH STREET
VANCOUVER, ... BRITISH COLUMBIA
1325 STANDARD BANK BLDG.

CLYDE TWO MARKS OF GUARANTEED QUALITY SUCCESSFUL PERFORMANCE A.G.C.-A.F.

The Lakewood Type C Finisher with Tandem Screed



NO matter what your road finishing problem may be, the Lakewood Type C Machine can solve it for you.

Single Screed, Tandem (Double) Screed, a combined screed and tamper operation - you can have your own choice.

It will pay you to find out more about this modern mechanical Screed.

Write for Bulletin "47 C"

EXPORT OFFICES: **30 Church St., New York City • • *CABLE ADDRESS:* Brosites**

LAKEWOOD

The Lakewood Engineering Co., **CLEVELAND • O.**

STRUCTURAL STEEL CREATED THE SKYSCRAPER

STEEL is qualified to serve anywhere

STRUCTURAL steel is not only the strongest, safest and most thoroughly reliable of all building materials—but it is the most adaptable. It is not hindered by bulk. It allows greater freedom in design. It permits the maximum of useful floor areas.

Steel is *proved right* before it leaves the mill. It comes to the job ready to go into place. Steel bridges or buildings of any size are more quickly erected, more economically altered, extended, remodeled or removed. Use steel with thorough confidence—to save time, to bring sooner occupancy and quicker dividends. By test, by experience it is most suitable for modern construction.

A Technical Service Bureau is at the disposal of architects, engineers, owners and others who have need of any information which can be supplied through the American Institute of Steel Construction, Inc.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

The co-operative non-profit service organization of the structural steel industry of the United States and Canada. Correspondence is invited. 200 Madison Avenue, New York City. District offices in New York, Worcester, Philadelphia, Birmingham, Cleveland, Chicago, Milwaukee, St. Louis, Topeka, Dallas and San Francisco.

The Institute publishes twelve booklets, one on practically every type of steel structure, and provides also in one volume, "The Standard Specification for Structural Steel for Buildings," "The Standard Specification for Fireproofing Structural Steel Buildings," and "The Code of Standard Practice." Any or all of these may be had without charge, simply by addressing the Institute at any of its offices.

STEEL

INSURES STRENGTH

AND SECURITY

SMALL SHOVELS

WITH A WORLD-WIDE REPUTATION

Those who know what a large proportion of the world's work in the small shovel field is being done by Bucyrus-Erie equipment are quick to appreciate the fact that unusual engineering and plant facilities are behind these small units.

From start to finish, Bucyrus-Erie small shovels are designed and built as if they alone comprised the whole product of the company. Two complete separate plants are devoted to their production and nothing else.

From its early days, this organization has built small shovels, has continuously studied conditions, on every conceivable type of job where they are used, and is responsible for many of the major improvements in this class of equipment.

As a result, Bucyrus-Erie small shovels are built, in every part, to meet the needs in their fields of operation. They have strength where strength is needed. Their weight is properly distributed. Each unit is exactly suited to the requirements. There is no make-shift construction in a Bucyrus-Erie.

Power shovels, clamshells, cranes, draglines, dragshovels—½ to 16 yard capacity — electric, steam, gasoline, Diesel, gas + air, Diesel + air. Dipper, hydraulic and placer mining dredges.

A-11-3-30-CM

BUCYRUS-ERIE COMPANY

Plants: South Milwaukee, Wis., Erie, Pa., Evansville, Ind. General Offices: South Milwaukee, Wis.
Branch Offices: Boston, New York, Philadelphia, Atlanta, Birmingham, Pittsburgh, Buffalo, Detroit, Chicago, St. Louis, Dallas, San Francisco.

Representatives throughout the U. S. A. Offices or distributors in all principal countries.

BUCYRUS ERIE

The Ransome 7-S STANDARD BUILDING MIXER

Built Like the Big Fellows

This discharge chute empties a full batch quickly and cleanly.

The Ransome 7-S Standard Building Mixer is built to the standards of the larger mixers and pavers. Take the water control, for example. The tank on the new 7-S is designed with a siphon which cuts off accurately and quickly *without dribble*. An easy quick-setting gauge, as well as a gauge glass is provided for the convenience of the operator. A non-by-passing valve—the Ransome Poppet Valve—is used.

All the way through, the same staff of engineers who designed the large Ransome pavers and built the big mixers for central mixing plants have put their best thought and experience into the design and construction of the Ransome 7-S.

In order to reduce the weight to get greater portability, in many places the same high-grade materials that we have been using for years in the famous 27-E "Master" Paver are used.

The 7-S has a skip that goes up in 7 to 8 seconds, a discharge chute that will empty a full batch in 7 to 9 seconds, a large capacity drum, with Ransome mixing action famous for years.

Ask for Bulletin No. 123.

Remember—when you purchase a Ransome Mixer you are getting a mixer built by an organization with 80 years' experience.

Ransome Concrete Machinery Company

1850—Service for 80 Years—1930

Dunellen New Jersey

WHY AN OWEN IS PROTECTED AGAINST BREAKAGE

A most important feature which protects Owen Buckets against breakage is the exclusive method by which the opening jaws are stopped at the correct digging position.

The center illustration shows how the lug portions of the heavy electric steel hinge castings engage the counter-weight at four points with sufficient "give" to absorb the dropping shock. All strains caused by the teeth or lips striking the material are likewise absorbed by this protective feature.

Every one of the Owen 17 Points of Leadership are items of Bucket construction well worth knowing. Send for an explanatory folder.

THE OWEN BUCKET COMPANY

6023 BREAKWATER AVE.
CLEVELAND, OHIO

17 Points of Leadership

1. One-piece steel crosshead.
2. No wear in upper or lower arm ends.
3. Heavy high carbon steel arms.
4. Adjustable undiminished closing power.
5. Long life to sheaves and cable.
6. Long arm bolt bearings sealed from grit.
7. Lever type steel arm brackets.
8. Closing cable is protected against excessive wear.
9. Heavy shock-resisting renewable lips.
10. Cable clips eliminated.
11. Sealed center shaft bearings.
12. Greater digging power with no dead weight.
13. Penetration and clean dumping.
14. Dropping shocks absorbed, eliminating breakage.
15. Rigid shell construction.
16. Heavy duty high carbon drop-forged steel teeth.
17. Lips or teeth points hit first.

Owen Buckets

WHEN CLAMSHELL BUCKETS ARE UNDER CONSIDERATION

November 27, 1929

Blaw-Knox Company
Box 915
Pittsburgh, Pa.

Gentlemen:

We have your favor of the 25th in regard to the Blaw-Knox buckets we bought from you. We consider the Blaw-Knox the best bucket by far on today's market. It not only is a better digger, which is the chief use of a bucket, but outlasts anything we have yet had. We would not consider any other bucket for future purchases.

Yours very faithfully,

STANDARD WHOLESALE PHOSPHATE & ACID WORKS, Inc.

(Signed) George A. Whiting,
PRESIDENT

The two letters shown here are typical of hundreds in our file endorsing the efficient, thrifty performance of Blaw-Knox Ball Bearing Buckets, They are the choice of users who want top-notch performance with economy. Catalog 1059 fully illustrates clamshells for every class of service. May we send it to you?

November 27th, 1929

Blaw-Knox Company,
P. O. Box No. 915,
Pittsburgh, Penna.

Gentlemen:

We have had one of your extra wide re-handling buckets of 2 cubic yards capacity for about 6 months. It has given every indication of handling more material during the course of a day than any other bucket we have ever used, picking up more than 2 yards at every bite.

It therefore gives us pleasure to heartily recommend this bucket as being most economical and efficient.

You may give anyone in the market for buckets our whole hearty indorsement.

Yours very truly,

SUPER CONCRETE CORP.

(Signed) H. B. Graham,
VICE-PRES.

BLAW-KNOX COMPANY
2086 Farmers Bank Building, Pittsburgh, Pa.
Offices and Representatives in all principal cities

BLAW-KNOX

"HERCULES"

RED-STRAND

REG. U.S. PAT. OFF.

WIRE ROPE

Dependable

You can depend on "HERCULES" (Red-Strand) Wire Rope, because: (1) It is made of acid open-hearth steel wire; (2) Its every wire has been rigidly tested by us to make sure that its qualities are of the highest for wire rope purposes; (3) It is correctly designed; (4) It is made according to methods that insure equalized tension throughout.

Economical

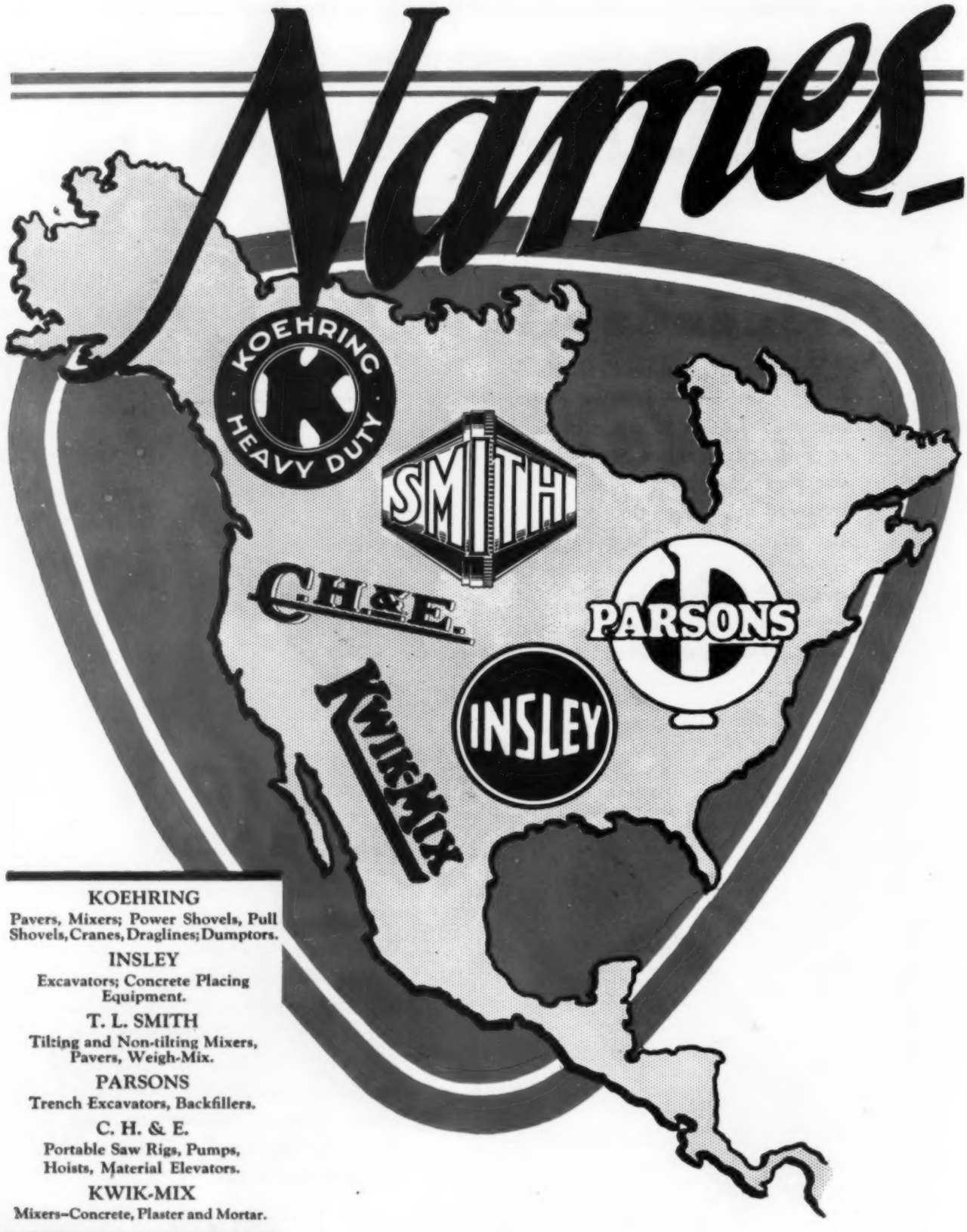
The same factors that make "HERCULES" (Red-Strand) Wire Rope dependable also make it long lasting, and you men who use wire rope know that its cost decreases as its life increases. Another very important advantage of a long-life wire rope is that fewer replacements are necessary, which means less idle time and steadier operation.

Made Only by **A. LESCHEN & SONS ROPE CO.** Established 1857

5909 Kennerly Avenue
ST. LOUIS

New York Chicago Denver San Francisco

Names.



KOEHRING
Pavers, Mixers; Power Shovels, Pull Shovels, Cranes, Draglines; Dumptors.

INSLEY
Excavators; Concrete Placing Equipment.

T. L. SMITH
Tilting and Non-tilting Mixers, Pavers, Weigh-Mix.

PARSONS
Trench Excavators, Backfillers.

C. H. & E.
Portable Saw Rigs, Pumps, Hoists, Material Elevators.

KWIK-MIX
Mixers–Concrete, Plaster and Mortar.

National Equipment

-built into America

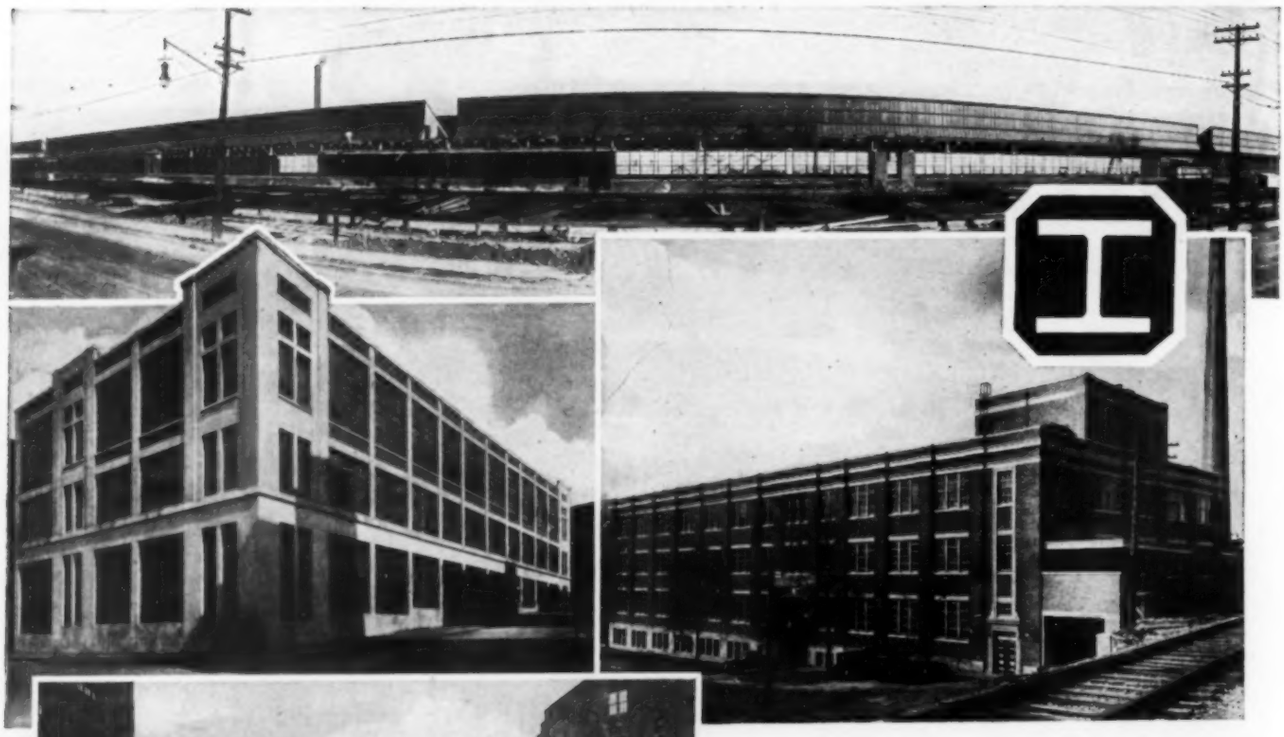
— built into towering skyscrapers, into teeming city streets—into far-flung highways and bridges — into great reservoirs — into the heights and the foundations that make this the wonder age of builders —

— into all of these are built the names that so long have stood for quality and integrity in construction machinery; for Koehring . . Insley . . T. L. Smith . . Parsons . . . C. H. & E. . . . Kwik-Mix . . . are now united in the greater name of National Equipment Corporation — N. E. C.! . . . Greater engineering — greater realization of super-quality — greater service to those who build with N. E. C. Equipment!

Corporation

30th St. & Concordia Ave.
Milwaukee, Wisconsin

A5683-II-C



The parallel flanges of Carnegie Beams add unique advantages and economies in industrial building construction

CARNEGIE BEAM SECTIONS are particularly adaptable to the construction of industrial buildings. Pictured above are several types of the many industrial buildings throughout the country in which these beams have been used with great economy and satisfaction.

A unique feature of Carnegie Beams is their parallel flanges. The elimination of internal flange slope provides eight non-sloping surfaces for connections instead of four, simplifying very markedly the great variety of connections usually required, such as special columns for cranes, crane girders, rail clamps, monorail tracks, brackets of all descriptions, pipe and conduit hangers, sash, partitions, machine bases and many others.

For long, heavily loaded spans there are Carnegie Beams up to 36 inches deep, in a great variety of weights and flange widths. These reduce obstructive columns to a minimum. For long, unbraced column lengths there are included in the series a wide selection of sections designed to give a maximum least-radius-of-gyration, combined with minimum weight.

Neatness of construction and simplicity of detail characterize jobs fabricated of Carnegie Beams. These sections merit the investigation of those interested in efficient and economical construction of industrial buildings.

CARNEGIE STEEL COMPANY ✣ PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

53

CARNEGIE BEAMS

UP and OUT!

With the

LOADMASTER

SWING-CRANE

PUT the Loadmaster to handling jobs that tie up your laborers' time. Loadmaster is compact, mobile, sturdy and can operate in close quarters. No stiff legs necessary for side lifts. Highest quality construction throughout.

Tractor mounted. McCormick-Deering powered. *It hauls as well as lifts.*

Swinging boom makes load "spotting" easy.

The field of application of the Loadmaster is unlimited. It is now being used by contractors, railroads, public utilities, industrial plants, municipalities, etc. Everywhere it is showing big savings in time and labor.

Rope pull—3,500 lbs. Width, 65 inches—length, 120 inches, exclusive of boom. Shipping weight, about 11,000 lbs. First cost—very reasonable. Operating costs—amazingly low.

Write for literature and complete specifications

Frederic H. Poor
Incorporated
342 Madison Ave.,
New York City

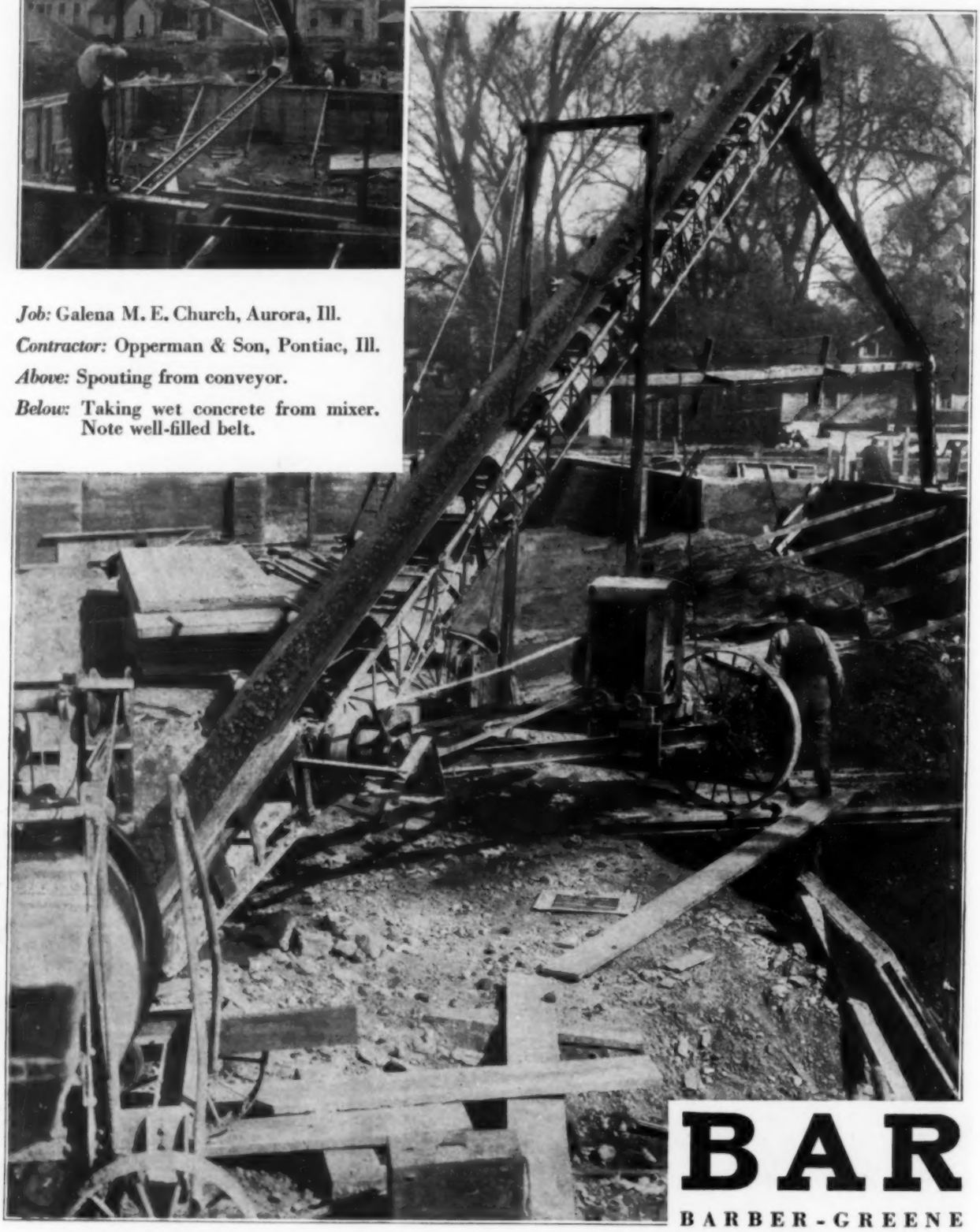
....What

Job: Galena M. E. Church, Aurora, Ill.

Contractor: Opperman & Son, Pontiac, Ill.

Above: Spouting from conveyor.

Below: Taking wet concrete from mixer. Note well-filled belt.



BAR

BARBER-GREENE

What.....No *Wheelbarrows?*

On this job, a 45-foot Barber-Greene did all the work usually assigned exclusively to wheelbarrows and wheelbarrow pushers.

The job is not big, as jobs go, but it illustrates the way Barber-Greene Conveyors are saving money for contractors on a wide variety of work.

As the boys broke sod, the Barber-Greene was set up to carry all excavated dirt out of the hole to waiting trucks or piles.

With the finish of the excavating, the receiving end of the Barber-Greene was set beneath the discharge chute of a one-bag mixer. This simple mixing plant was located in the center of the job.

From that location the conveyor, carrying two chutes on the discharging end, delivered all foundation concrete directly into the forms.

No wheelbarrows were there—and what's more, no expensive wheelbarrow pushers.

On simple jobs like this, to big ones like the Merchandise Mart in Chicago where 55 Barber-Greenes handled all floor concrete and aggregates, as well as excavated material, these conveyors are showing contractors new ways to profits.

For the Barber-Greene's broad belts provide a smooth-riding, swiftly-moving highway for any loose or semi-loose material.

All you do is put the stuff on one end and watch it come off the other—just where you want it.

Taking dirt from excavation to truck

◆ ◆ ◆

So important is the place the Barber-Greenes have gained in the handling of wet concrete and other materials, that we have prepared a book covering typical Barber-Greene Conveyor jobs.

These jobs range from small buildings up to the world's largest, to locks and retaining walls, bridges and sewers, subways to irrigation ditches . . . or what have you.

Just send a post card for a copy of: *New Applications and Set-Ups*. No obligation, of course.

BARBER-GREENE

STANDARDIZED MATERIAL HANDLING MACHINES

COMPANY, 530 WEST PARK AVENUE, AURORA, ILLINOIS

Tramway carrying 220 tons hourly of sand and gravel for the construction of the Pardee Dam in California. Built for the contractors—Atkinson Construction Co.

...cable used on Amer-...can Steel & Wire ...ompany Tramways

AMERICAN
TRENTON-BLEICHERT SYSTEM
Aerial TRAMWAYS

This system provides an economical and dependable method of transporting material in every kind of country—over mountains, valleys, and rivers; to and from locations entirely inaccessible by surface routes.

We supply everything from the preliminary plan to the completed tramway. Let our engineers help you with your transportation problems.

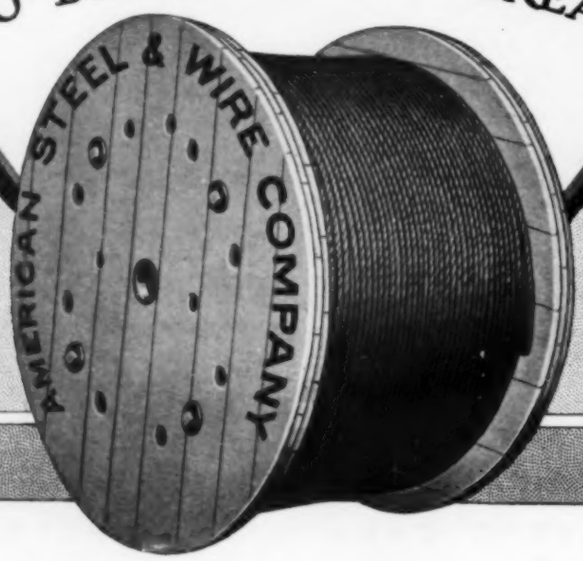
AMERICAN STEEL & WIRE COMPANY

SUBSIDIARY UNITED STATES STEEL CORPORATION

208 S. La Salle St., CHICAGO — Offices in All Principal Cities — 30 Church St., NEW YORK

U. S. Steel Products Company — San Francisco, Los Angeles, Portland, Seattle, Honolulu
Export Distributors: 30 Church St., New York

NO GRADE TOO STEEP
NO DISTANCE TOO GREAT



LARGEST MANUFACTURERS OF WIRE ROPE IN THE WORLD

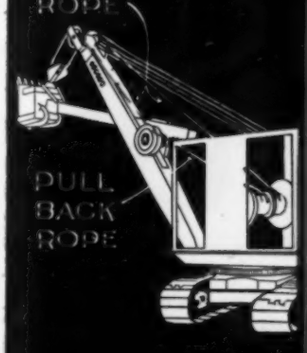
Crowd!

3/4 TO 6 YARDS
COMMANDER
CONQUEROR
VICTOR
RAILROAD
GASOLINE STEAM
ELECTRIC
DIESEL

The Osgood CONQUEROR tears up 2,500 square yards of old concrete and asphalt pavements per 9 hour working day for Agabiti Bros., General Contractors of Trenton, N. J. In the photograph this shovel is tearing up a brick pavement with concrete base. In tough digging this Osgood moves 500 tons per day.

HOIST CROWD ROPE

PULL BACK ROPE



The OSGOOD wire rope crowd is based upon the simple principle that any force or pull exerted upon a line exerts an equal force or pull on all parts of the line. The multiplication of this power through gears makes the tremendous crowd of an OSGOOD possible. Note the simple rigging above.

Enormous Power for Hard Digging MAKES DIPPER BITE DEEP

The tremendous crowding force of an OSGOOD puts all of the power right down in the dipper teeth—it eats into the work no matter how tough the going. The patented OSGOOD wire rope crowd is simple, positive, and has enormous power. It does everything a crowd should do. It shakes the dipper. Gives uniform crowd when working dipper close to the truck. Cuts to any grade—even a vertical bank—within a fraction of an inch. Gives wide clean-up. Has crowding or racking-in force equal to dipper pull.

THE OSGOOD CO.
MARION OHIO

TALK NUMBER THREE BY A PROMINENT DISTRIBUTOR

"Reason This Out For Yourself—

Above—Mr. W. H. Cross, Treasurer of Cross Brothers Company, Inc., of Rochester, New York. This company's services are of a definite economic value to the prosperity of its business territory.

WE bring to consumers of Industrial Supplies the combined experience and research work of all competing manufacturers all over the country. We sift out the real values for our field—we earn our right to existence and support—it's common sense without sentiment. Our recommendations are the result of experience and we recommend Republic's Belting—Hose—Packing—Molded and Lathe Cut Goods."

The above statement is characteristic of those made by prominent distributors all over the country. It explains in part how the Industrial Supply Distributor, helping to solve the important problem of broad markets and *economical* distribution, upholds high quality, maintains fair prices and saves needless efforts on the part of both consumer and manufacturer.

STEAM HOSE for any service is available through this Republic distributor.

Such well known brands as Champion--Double Cross--Tower--Chariot—Hector— or 50-50 give a full range of quality for any service from the carrying of superheated steam to warm water.

Write for a sample

THE REPUBLIC RUBBER CO.

Youngstown
Ohio

REPUBLIC means the Best Mechanical Rubber Goods

The One Machine

for excavating in cramped quarters

WHAT would you use for excavating where you have no room for turntable swing—or in a narrow alley or between trestle bents?

The one logical tool for use in cramped quarters is the continuous digging

HAISS "EXCAVATOR"

On the job pictured, Rawson & Walker, Contractors, cut this underpass through a Chicago railroad embankment where the digging consisted of virgin clay, slag ballast, loose rock, sand, old timber trestle, old piling and 16 to 24 inches of frost. They took out 350 to 450 cu. yds. in eight hours and were backing the trucks in 250 feet. This was one of the first Haiss Excavator jobs and such a wonderful performance we're still telling about it. *Have you read our Bulletin 629?*

GEORGE HAISS MANUFACTURING CO., INC.
139th STREET and CANAL PLACE, NEW YORK, N. Y.
Representatives in all Principal Cities

H-647

HAISS EXCAVATOR

Again— the Big Little Puller HANDY-ANDY

"REG. U. S. PAT. OFFICE"

accomplishes an enormous task moving centering for world's longest multiple-arch concrete highway bridge.

Prominent among the reasons for the ahead of schedule progress on this huge $2,500,000 bridge structure, is the ingenious system being used by the Wiley-Maxon Construction Co. of Dayton, Ohio, for quickly setting and moving the immense steel arch centering. Ten of these steel centers, designed by Blaw-Knox, each weighing 100 tons are being actually moved as units, thus materially speeding up construction. A plan, devised by Glen M. Wiley and G. W. Maxon the contractors and carried out with the aid of the famous little Handy-Andy Puller.

CONTRACTORS: ENGINEERS

You can profitably use the Handy-Andy Puller hundreds of times in scores of different ways on every heavy job. Easy to operate, easy to move, built to last a life time. Write for illustrated bulletins describing the Handy-Andy and its many uses on construction work. Copy sent without obligation.

As shown in the photos above, a bottom grillage is hung from yokes, serving as track along which the centering is moved with the aid of the Handy-Andy Puller and a few men. The sturdy little Handy-Andy cleverly moves the centering laterally into position for new concrete arch rib,—accomplishing this herculean task with utmost efficiency and maximum economy. The story of the great span across the Susquehanna River will record another impressive testimonial to the versatility of the remarkable Handy-Andy Puller —the inexpensive device that saves time, men and money on scores of heavy jobs. Tremendous power, in light, compact and portable form.

JOHN WALDRON CORPORATION

Builders of Quality Machines Since 1827

Address Main Office: **RIVER ROAD, NEW BRUNSWICK, N. J.**

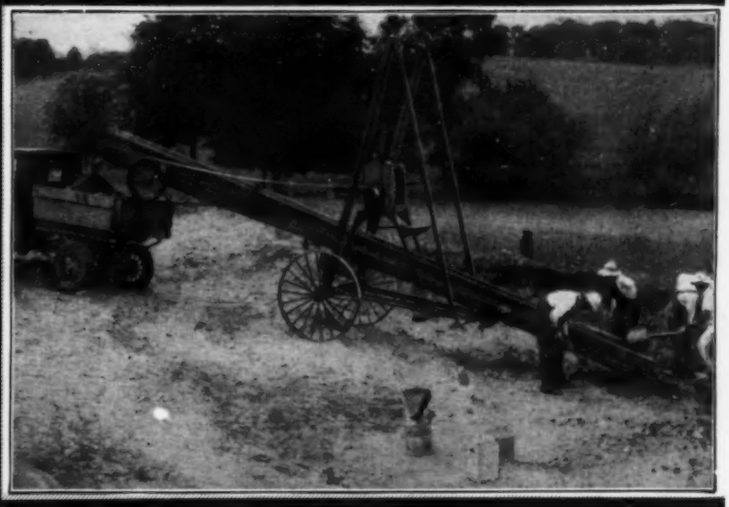
The PA Power Chassis by Northern is standard; available on any conveyor.

NORTHERN CONVEYORS FULL POWERED, SELF-PROPELLED

NORTHERN BUILT BETTER SERVICED BEST MATERIAL HANDLING EQUIPMENT

MODEL PA-KING

This is the famous Northern King Conveyor, mounted on PA Power Chassis—belt speed 175 ft. per min., 24-in. belt, 16-ft. to 70-ft. lengths. Full automatic controls, self-propelled. Details and prices on this and other Northern Handling Equipment are yours for the asking.



Model UB (left)

This model is fully standardized; the Northern production produet . . . thus is priced on a most satisfactory basis. In 21-ft. length only; belt speed above or below 175 ft. per min., handles 60 to 70 tons per hour. Write for complete details and prices if this is the model you require.

Model B-18 (above)

Full portable as illustrated or may be had mounted on PA Power Chassis. 15-ft. to 60-ft. lengths, belt speed 175 ft. to 300 ft. per min., handles 60 to 70 tons per hour. With PA Power Chassis this Model B-18 represents the most efficient handling device of its type and capacity. Write for detailed description and prices.

MAY WE SEND DATA AND PRICES . . . . . ?

NORTHERN CONVEYOR & MFG. CO.

Dept. 20

JANESVILLE, WISCONSIN

Detroit Factory Branch: 13712 Tyler Street

BRANCHES AND STOCK POINTS AT

San Francisco, Calif. · New Haven, Conn. · Rochester, N. Y. · St. Paul, Minn. · Springfield, Ohio · Cleveland, Ohio · Pittsburgh, Penn. · Detroit, Mich.

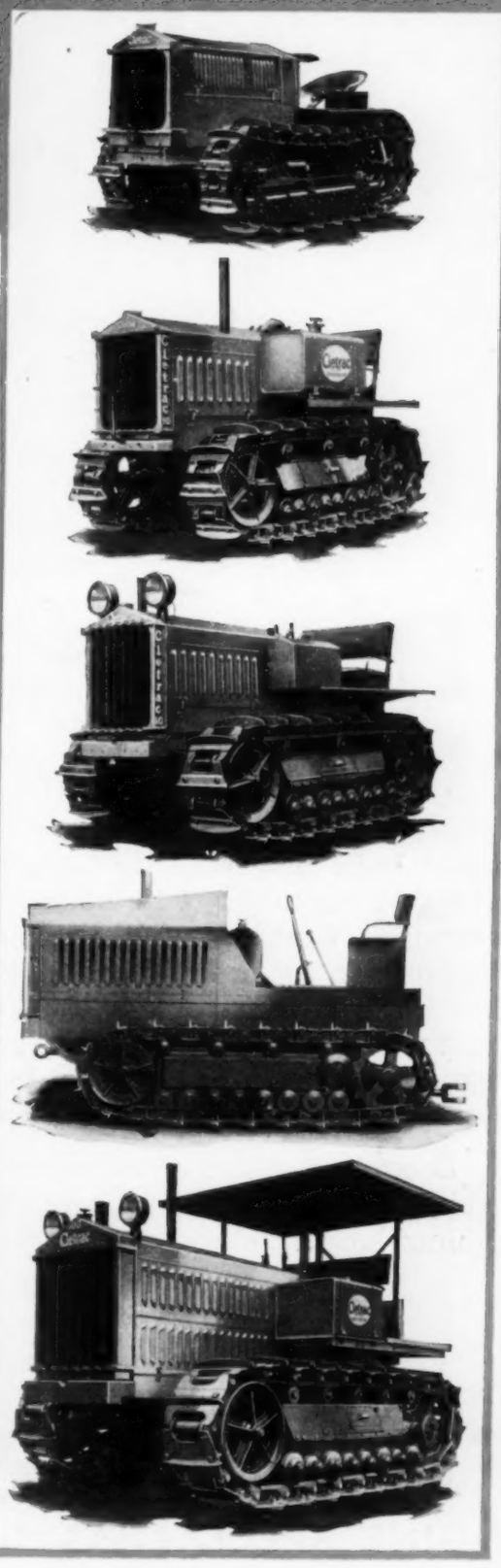
Speed Up the with Cle

THE big program of spring and summer work is a challenge — every year — to your tractor equipment. Will it measure up, *this year,* to the long days of punishment ahead? Has it the capacity and speed to hold down costs and cut time to a minimum? Or is it going to penalize you — through inefficiency and exorbitant upkeep?

Right now — with the big months directly ahead — is the time to weed out "slackers" and replace them with efficient, dependable units that you can bank on to meet every requirement — fully and economically.

Spring Schedule

trac

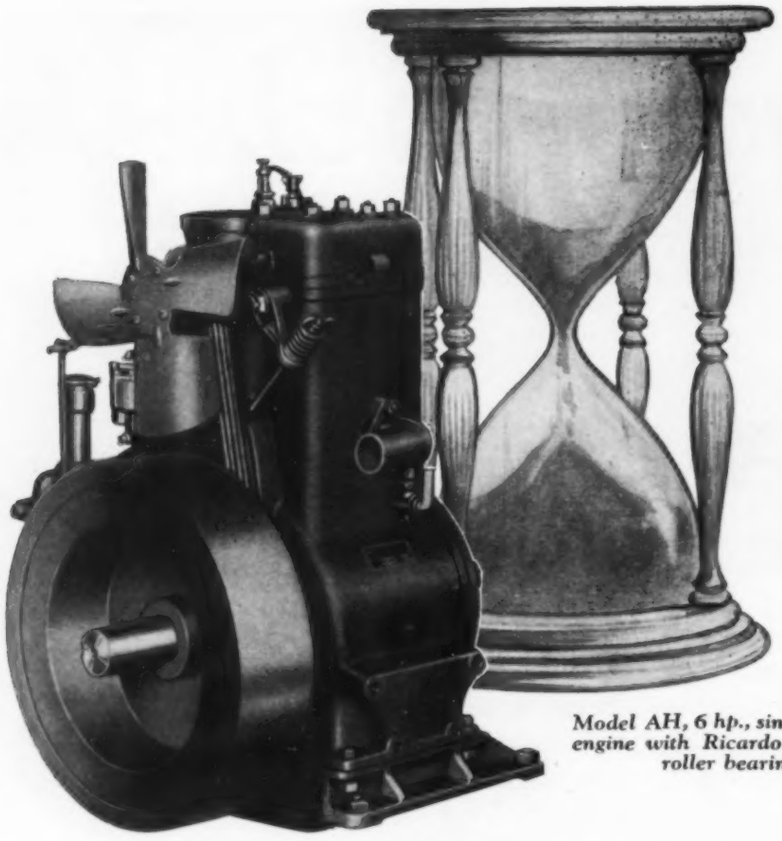


SINGLY, and in fleets, these rugged powerful Cletracs are at work this Spring helping highway officials, contractors and engineers to get the most out of appropriations and the best out of every job. They are tractors of outstanding ability — "work eaters" that have won reputation and distinction through their many years of valuable service to tens of thousands of tractor users.

Here is power efficiency unsurpassed by any other tractors—regardless of type or price. Here is traction, speed, economy, endurance. Here is every possible feature for making jobs move faster and cost less per yard, per mile or per day.

Cletrac Crawlers are built in a complete line of models and sizes, ranging in power delivery from 20 h. p. to 100 h. p. See the local Cletrac distributor or write direct for literature.

The Cleveland Tractor Co.
19323 Euclid Avenue Cleveland, Ohio



Model AH, 6 hp., single cylinder engine with Ricardo Head and roller bearings.

DO YOU KNOW HOW LONG AN ENGINE SHOULD LAST?

We don't. Fuller & Johnson engines built nearly thirty years ago are still running. The same high standards that were followed so religiously in those first engines have been carried on through the years and as a result today, as thirty years ago, Fuller & Johnson engines are known everywhere as the finest.

Long life is built into every engine. All parts are accurately machined and carefully assembled . . . only perfect parts can pass the drastic series of inspections to which they are subjected. Extra long bearings . . . rigid crankshaft construction . . . carefully balanced reciprocating parts . . . generous use of anti-friction bearings . . . together with a specially designed lubrication system . . . eliminate destructive vibration and excessive wear. All these factors result in that smooth performance and remarkable stamina which means *extra* long life.

Complete details of the engine illustrated . . . or other Fuller & Johnson power units . . . sent on request. Write Fuller & Johnson Manufacturing Co., manufacturers of single and multi-cylinder . . . air and water cooled . . . horizontal and vertical engines, in various sizes. Address: 30 Coma Street, Madison, Wisconsin.

FULLER & JOHNSON

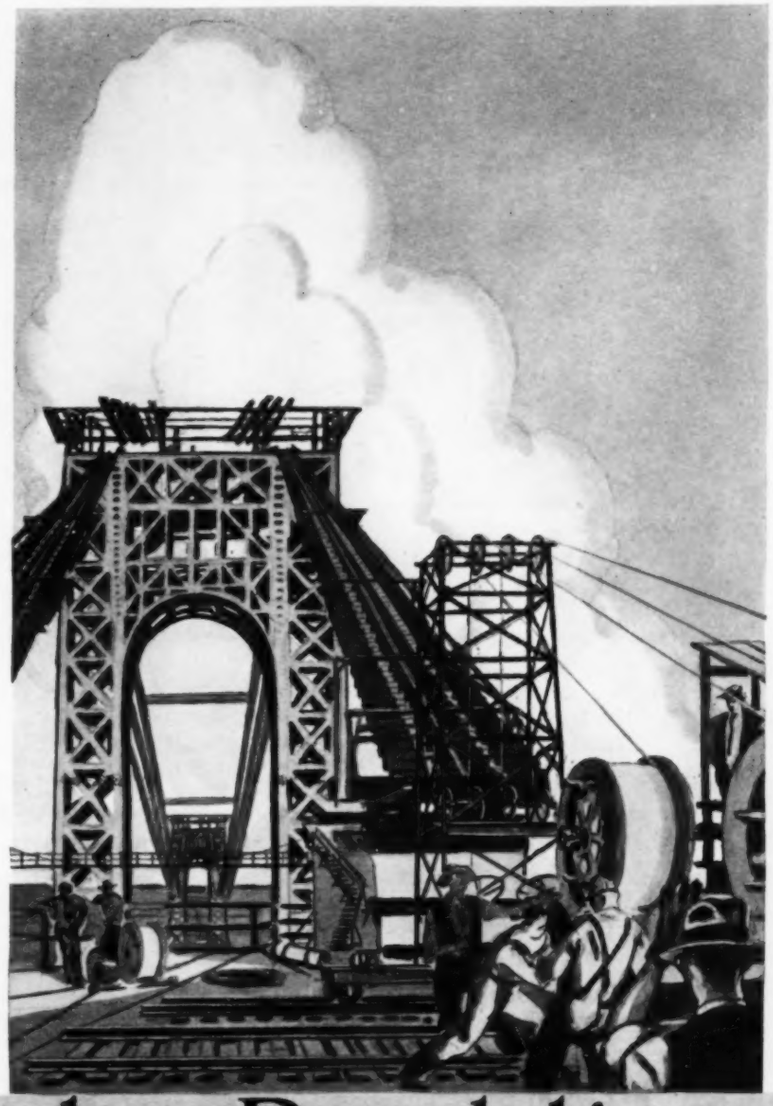
ENGINE SPECIALISTS — ESTABLISHED 1840

and- the Bridge took form with the spinning of the cables

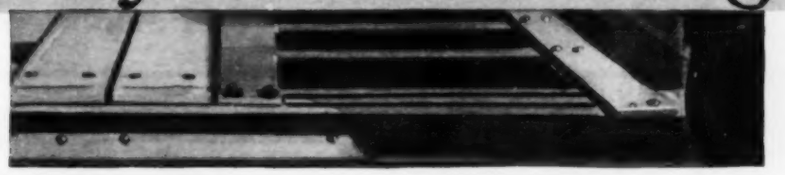
High above the waters of the Hudson, workmen are spinning the steel wires which will form the four gigantic cables supporting the roadway of the largest and longest suspension bridge in the world.

The wire is wound on steel reels, each containing approximately 160,000 feet of wire, and is shipped on special cars from the Roebling plant to the bridge site, where they are mounted on the spinning machinery. Day after day, the wires will be spun —without cessation—on each of the four cables simultaneously, until 105,896 wires have been separately and securely anchored into place.

The cables are composed of wires each .195″ in diameter and their length, if placed end to end, would be sufficient to encircle the globe four times at the equator. The cables will be 5,212 feet long between anchorages; the diameter 36″ and the total weight 57,000,000 pounds.



Cables by Roebling



John A. Roebling's Sons Company
Trenton, New Jersey.

MORNING

Quick Work

EVENING

High-Early-Strength Concrete Permitted Use of This Sidewalk in Less Than a Day

Immel Construction Co., Fond du Lac, Wis., contractor; Russell Barr Williamson, Milwaukee, architect

Less than a day after the concrete was placed, the sidewalk in front of the Bay View Theater, Milwaukee, was used by a large opening-night crowd. The Immel Construction Co., contractor, mixed, placed and cured the concrete according to Universal Atlas tested methods.

To complete the contractor's records the sidewalk was carefully examined by a construction engineer about six months after the work was done. As was expected, the concrete made according to these methods was found in excellent condition. It was much stronger and denser than is ordinarily obtained on sidewalk jobs.

Description of these methods for obtaining high-early-strength concrete with the standard portland cement of the Universal Atlas company (the same as furnished for ordinary work) will be sent on request. Just use the coupon.

Universal Atlas Cement Co.

Subsidiary of United States Steel Corporation

Concrete for Permanence

Universal Atlas Cement Co.
208 South La Salle Street, Chicago

Without obligation, please send me methods for securing high-early-strength concrete with the standard portland cement of the Universal Atlas company.

Name_____

Address_____

City_____ State_____

CM 3-30

PRODUCTS: *Atlas Portland Cement, Universal Portland Cement, Atlas White Portland Cement, Atlas Lumnite Cement*

PLANTS AT Hudson, N. Y., Northampton, Pa., Universal, Pa., Buffington, Ind., Duluth, Minn., Hannibal, Mo., Independence, Kan., Leeds, Ala., and Waco, Tex.

OFFICES IN Chicago, New York, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Columbus, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Omaha, Oklahoma City, Birmingham and Waco

Copyright U. A. C. Co., 1930

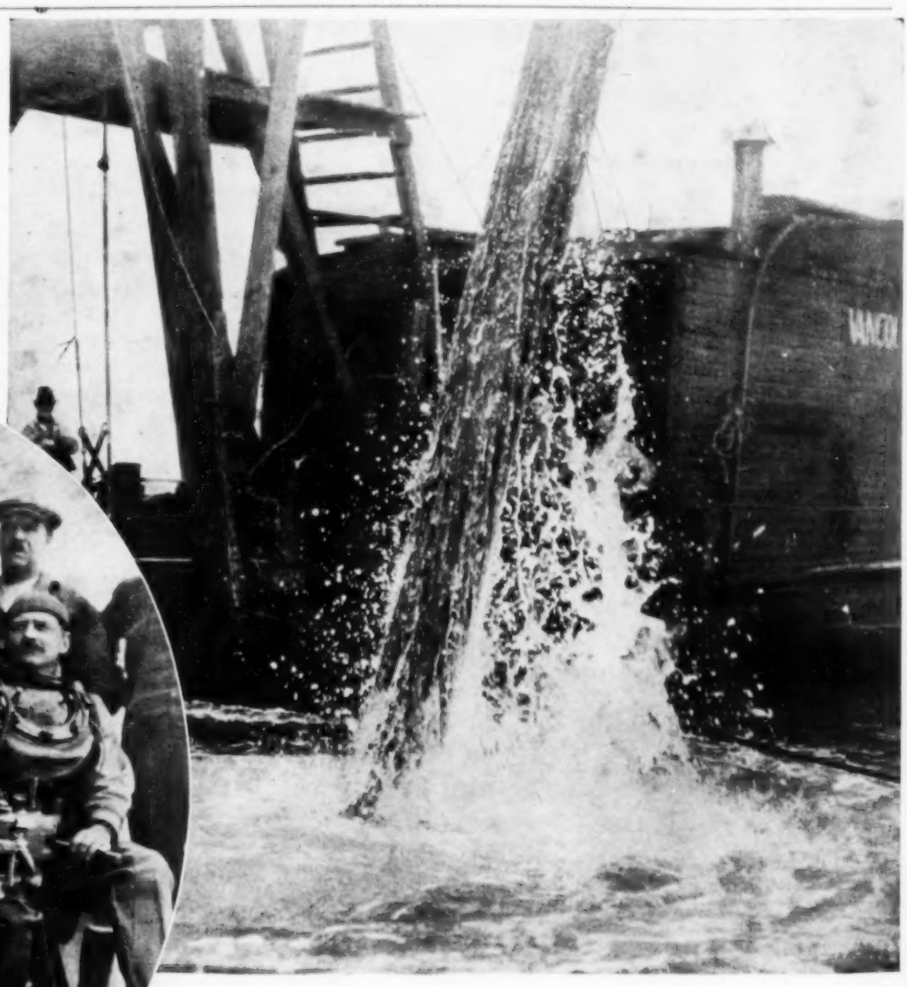
Construction Methods

A McGraw-Hill Publication—Established 1919

ROBERT K. TOMLIN, *Editor*

VOLUME 12 NEW YORK, MARCH, 1930 NUMBER 3

WOOD PILE (*right*) shoots to surface after being cut off at depth of 40-ft. by mechanical saw (*below*) powered by compressed air motor and operated by divers.



Air-Powered Saw

CUTS PILES UNDER WATER

FOR cutting off wood piles under water at depths ranging from 40 to 75 ft. the Vancouver District Sewerage and Drainage Board has made effective use of a mechanical saw powered by a compressed air motor and operated by two divers. Under the direction of A. H. Mole, superintendent of construction, the job involved the cutting of more than one-thousand fir piles from 14 to 18 in. in diameter. For this operation a Wolf saw developed by the Reed-Prentice Corporation of Worcester, Mass., was served with air at from 95 to 100 lb. pressure by a Sullivan Portable compressor. A detail which facilitated the submarine work was the rigging of a lever on the handle of the saw opposite the air motor so that the diver could hold the cutting edge constantly against the surface of the pile.

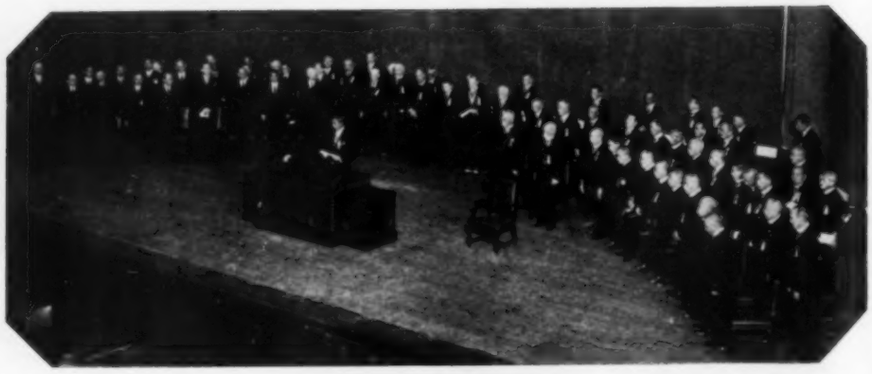
In cutting at the shallower depths air from the motor of the saw was exhausted directly into the water but below the 40-ft. level an adapter carried the exhaust air up to the surface. With the rig illustrated the rate of progress for the submarine cutting is reported as five 18-in. piles in 15 min. Each time the saw is brought to the surface it is cleaned and well lubricated. Periodic sharpening of the saw teeth is necessary to offset the dulling effect of sand and other hard substances adhering to the surfaces of the underwater piles.

This Month's

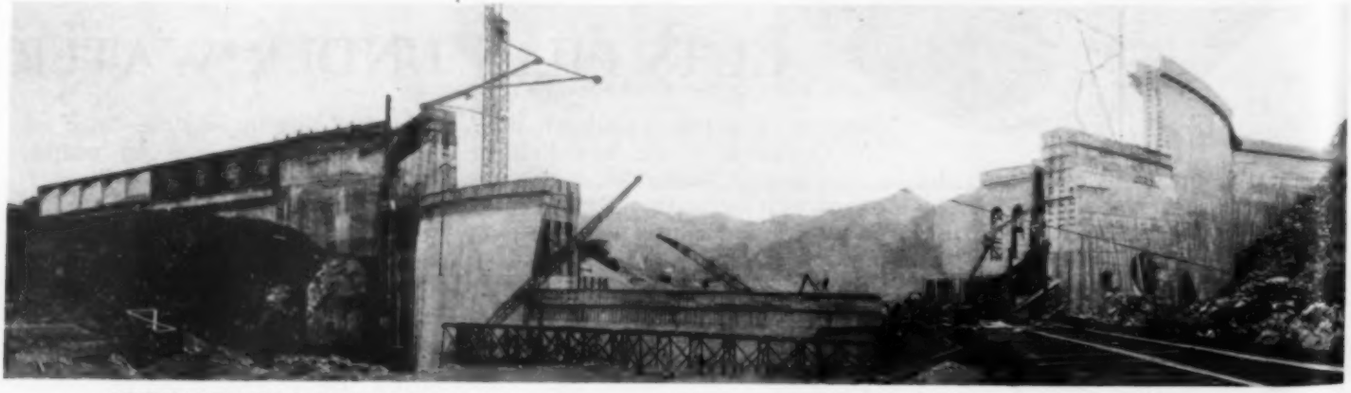
©Wide World

TALLEST OIL DERRICK. Erected at Signal Hill, Calif., this structure is a veritable skyscraper, towering to a height of 175 ft. and enabling drillers to handle six lengths of well casing at one time.

SUISUN BAY BRIDGE for Southern Pacific Railway takes form across arm of San Francisco Bay. From falsework locomotive cranes place 80-ft. steel girders. General contractors, Siems, Helmers & Schaffner, Inc., of St. Paul; steel erection, U. S. Steel Products Co.

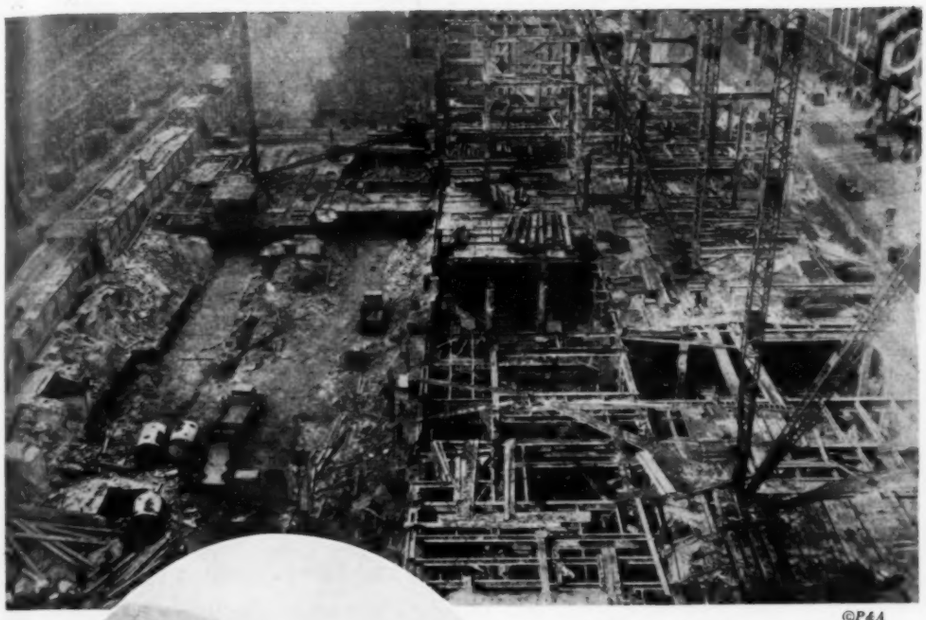


INTERNATIONAL ENGINEERING CONGRESS, assembled in Municipal Auditorium at Tokyo, Japan, listens to address of welcome by H.R.H. Prince Chichibu, patron of the convention



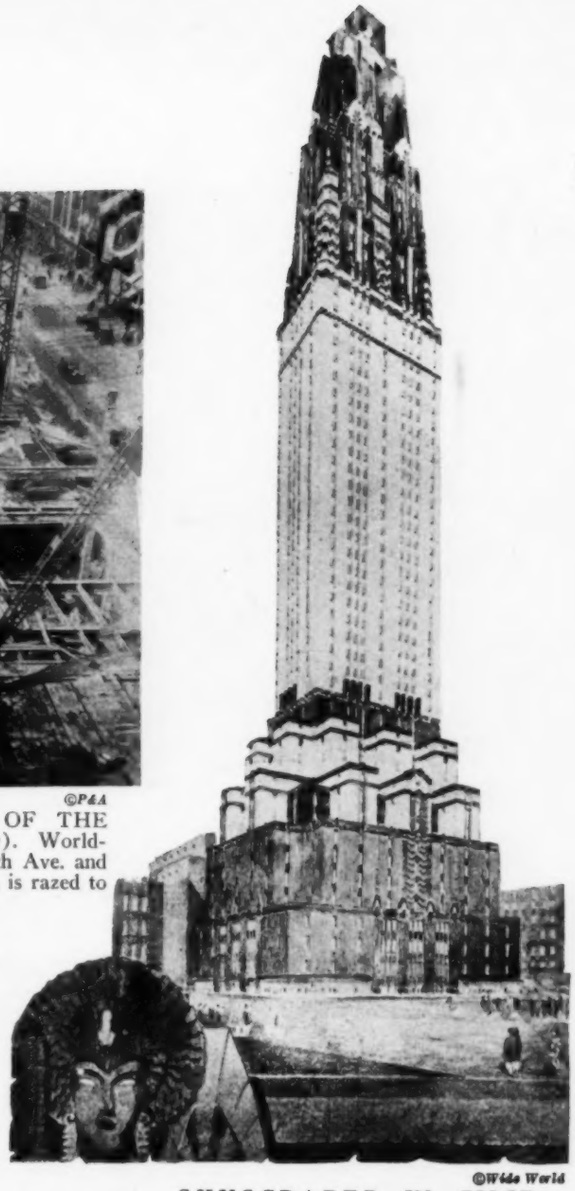
STEWART MOUNTAIN DAM in Arizona nears completion under direction of C. C. Cragin, chief engineer, Salt River Valley Water Users' Association. Central arch with top 212 ft. above bedrock, abuts against massive concrete piers. Overall length of dam, 1,200 ft.

"News Reel"



©P&A

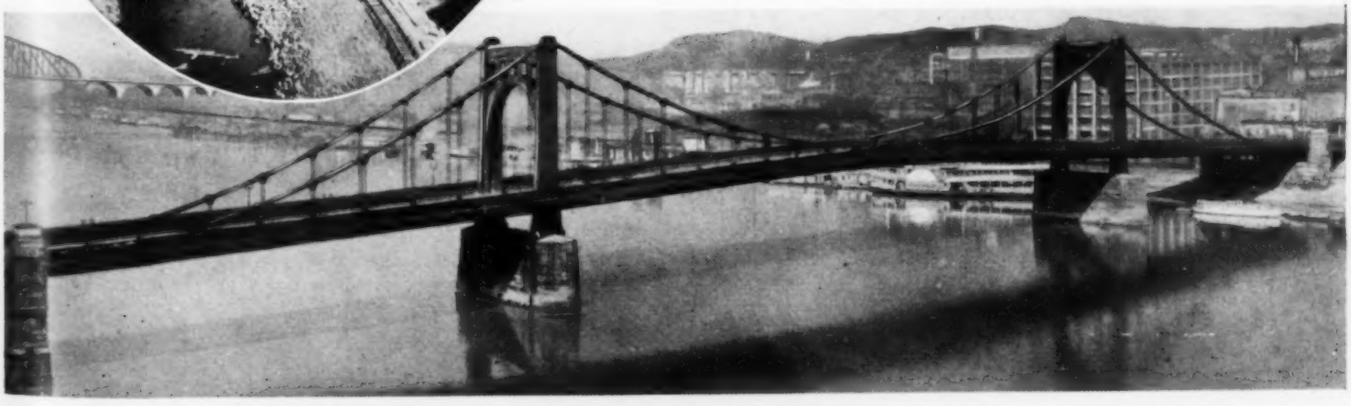
THE PASSING OF THE WALDORF (*above*). World-famous hotel at Fifth Ave. and 34th St., New York, is razed to make way for 80-story Empire State Building, under construction by Starrett Bros.



©Wide World

SKYSCRAPER IN COLOR (*above*). William Bergen Chalfant, Pittsburgh architect, has planned for Amos Parrish & Co. in New York 60-story structure decorated with polished terra cotta blocks of various colors.

AT OWYHEE DAMSITE (*left*), Oregon, General Construction Co. has bypassed river through diversion tunnel on U. S. Reclamation Bureau project.



"MISS AMERICA" AMONG BRIDGES. Sixth Street crossing over Allegheny River, Pittsburgh, wins American Institute of Steel Construction's award for most beautiful bridge built during 1928. Designer, V. R. Covell, chief engineer, Public Works Dept., Allegheny County. Contractors, American Bridge Co. and Foundation Co.

DEEP OPEN CUT REPLACES

Main Line Improvement on Chesapeake Provides Clearance for Larger Rock Near Existing Line

AS A part of an extensive main line improvement program the Chesapeake & Ohio Railway Co. has eliminated the double-track Ona tunnel, 1, 316 ft. in length, nine miles east of Huntington, W. Va., by making an open cut, 2,000 ft. long and 115 ft. in maximum depth which required the removal of more than 680,000 cu. yd. of material, most of which was classed as rock.

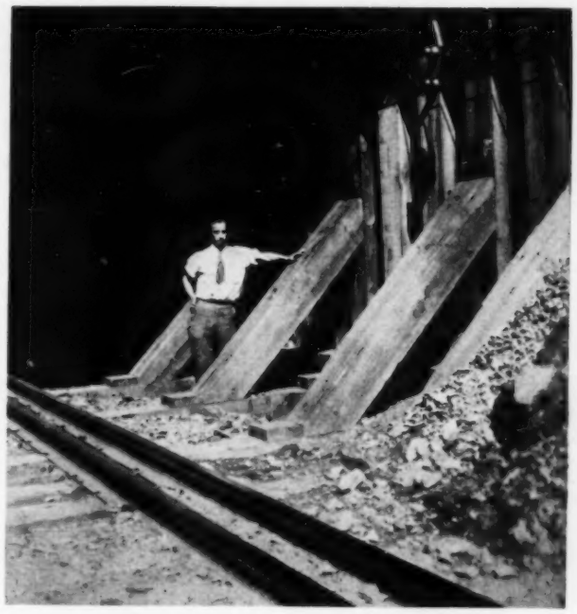
WIDENING APPROACH CUT. *(left)*. Shovel, served by trucks, did this work on both approaches, making its way through solid rock. Material was hauled by trucks to waste banks. MUCKING OUT LAST LIFT OF CUT *(below)* High-lift shovel at final grade loads 6-yd. dump cars which operate in 4-car trains. At this stage main-line traffic is still operating through tunnel on gauntleted tracks shown.

The Ona tunnel, built in 1907, lacked sufficient clearance for the larger rolling stock used to handle present-day traffic. The volume of the traffic on this line also has increased greatly since the tunnel was built. Moreover, the prospects are for much greater growth in the near future. At the same time, there had been some spalling of the concrete lining of the tunnel, although this spalling had never reached serious proportions. In view of all the conditions, however, the decision was made to eliminate the tunnel by making the immense open cut.

Alternative Plans—Careful studies

RAILROAD TUNNEL

& Ohio Near Huntington, W. Va. Rolling Stock—Blasting Demands Care



HEAVY TIMBERING placed in the tunnel to protect traffic against possible damage from falls of concrete lining resulting from blasting operations in the cut.

were first made of the cost of enlarging the tunnel under traffic and of eliminating it by means of the cut. These showed that the estimated cost of enlargement was little less than the expense involved in making the open cut. The enlargement operations also would have hindered traffic much more, to say nothing of the greater hazards. Hence the decision to make the larger expenditure. The improvement thus obtained likewise will render future operation much more economical and satisfactory. The cut with the bottom width of 70 ft. that had to be made further provides ample space for all of the trackage that is likely ever to be needed at this point in the system.

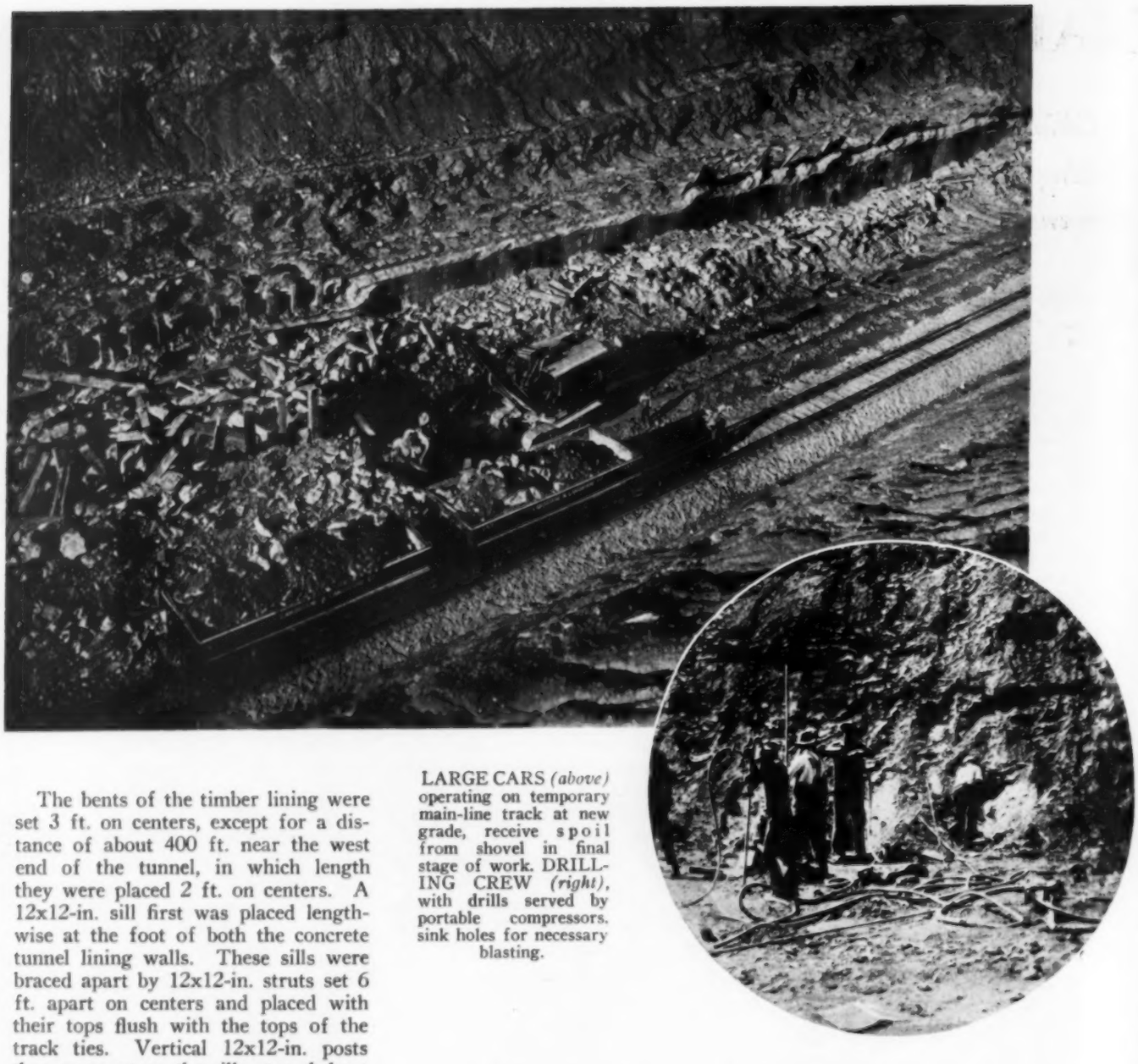
The plans called for the toe of one slope of the cut to be 46 ft. from the center line of the tunnel, while the toe of the other slope was 24 ft. from that line. This plan was adopted to permit the excavation to be carried to grade on one side of the tunnel so that a gauntlet track could be laid around the latter in the bottom of the cut. In the meantime, while the excavation was under way, traffic was handled through the tunnel until the track could be laid in the cut.

Tunnel Heavily Timbered—Practically all of the material in the cut had to be loosened by blasting before it could be removed. In fact, much of it was tough, solid, ledge rock. In order to protect traffic in the tunnel against possible damage from falls of the concrete lining, the entire tunnel was heavily timbered before blasting operations were started.

Since the timbering reduced the tunnel section so that double-track operation was impossible through it, the two main-line tracks were gauntleted on the center line of the tunnel. Steps then were taken to facilitate train movements, with no blasting done while traffic was near. To this end, a signal man was stationed on top of the hill pierced by the tunnel. He had telephone connections with the signal tower men beyond both ends of the project. He also was in touch at all times with the superintendent in charge of operations in the cut.

With this scheme it was possible to carry on the work with a minimum of interference with traffic. At the same time, all hazards to traffic were avoided, not a single piece of rolling stock being damaged during the entire job.

TUNNEL NEARLY STRIPPED on one side. Power shovels were operated with great care at this stage to prevent damage to concrete tunnel lining. Service track is at left with main-line track at right.



LARGE CARS *(above)* operating on temporary main-line track at new grade, receive spoil from shovel in final stage of work. DRILLING CREW *(right)*, with drills served by portable compressors, sink holes for necessary blasting.

The bents of the timber lining were set 3 ft. on centers, except for a distance of about 400 ft. near the west end of the tunnel, in which length they were placed 2 ft. on centers. A 12x12-in. sill first was placed lengthwise at the foot of both the concrete tunnel lining walls. These sills were braced apart by 12x12-in. struts set 6 ft. apart on centers and placed with their tops flush with the tops of the track ties. Vertical 12x12-in. posts then were set on the sills at each bent of the lining. These posts were cut to the height of the springing line of the concrete lining arch.

Each third post was knee-braced against the corresponding bottom strut of the bent by a 12x12-in. timber. The beveled ends of these braces were set against short 3x10-in. blocks spiked to the struts and posts, no dapping being done in the latter. The results were satisfactory and at considerably less cost than dapping.

On top of the posts was placed a 12x12-in. wall plate to carry the seven-segment 12x12-in. arch ring of the timbering. Above the wall plates the entire arch was lagged with 2x8-in. plank set lengthwise and driven tightly together.

Placed Under Traffic—The timber lining was placed under traffic by regular crews of the bridge and building department of the railroad. The timbers were framed and cut accurately to shape and size outside the ends of the tunnel. The sills, cross struts, posts and wall plates could be set with comparative ease. The struts were cut in half to facilitate placing. After they were set they were spliced together with 60-penny nails.

For setting the segments of the timber arch ring two narrow movable scaffolds were used, one either side of the track. The width of these was such that they could be placed just inside the plumb posts and still allow clearance for trains. As the timbering progressed they were skidded ahead on 3-in. plank supports laid on the cross struts.

A working platform for the men who set the top segments of the timber arch rings was obtained by placing seven 3x10-in. planks loose across the track on the tops of the movable scaffolds. These planks had to be moved to permit trains to pass. When that was necessary, they were bunched and picked up by a block and tackle attached to one of the upper segments and then swung aside to the top of one of the scaffolds.

The lagging was placed as the timbering progressed. It was cut in 4-ft. lengths where the bents were spaced 2 ft. on centers and in 6-ft. lengths where the spacing was 3 ft.

The first day the crews set ten bents of the timbering. They soon acquired experience that enabled them to attain a rate of 40 bents in 8 hours. This was in the face of from 20 to 30 train movements per 8-hour shift through the tunnel. Many of these trains also were long slow-moving coal drags of from 100 to 115 cars each.

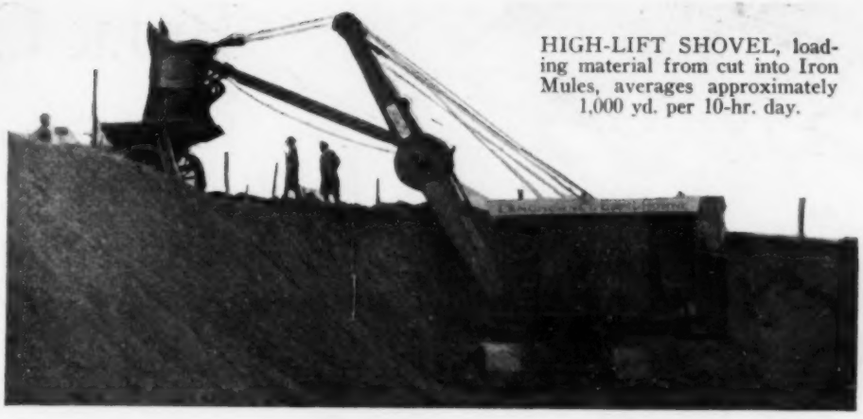
Material Handled With Care—

While the removal of the material in the cut had to be handled with exceeding care, it was a comparatively simple operation. Four 1¼-yd. Lorain gasoline shovels were installed to excavate and load the spoil. In the beginning the material was hauled from the shovels to waste banks in motor trucks. Later narrow-gage tracks were installed for operating 6-yd. dump cars in 4-car trains to serve two of the shovels.

The main part of the cut was taken out in lifts of from 12 to 14 ft. in depth. The service tracks were run in both directions on ascending grades to waste banks outside the original right-of-way. Gasoline locomotives handled the four-car trains of loaded 6-yd. cars on grades up to 4 per cent satisfactorily.

While two of the shovels worked on the main body of the cut, the other two worked on the approach-cut widening at both ends. Spoil from these two end shovels could all be removed in motor trucks. By the time the approach cuts had been brought down to grade for the full 70 ft. width of the bottom of the completed work, the other two shovels had carried the cut as deeply as was safe on the narrow side of the cut with respect to the tunnel. A narrow-gage track then was run through on the wider side of the cut. The remaining material next was removed in two lifts down to the final grade.

Following this scheme of operations the cut was made to the proper level with practically no disturbance of the tunnel until the last lift of material along the tunnel next to the wider side was being blasted. A shot there caused numerous cracks in the arch part of the tunnel lining, but did not cause any falls from the tunnel roof until after traffic had been diverted.



HIGH-LIFT SHOVEL, loading material from cut into Iron Mules, averages approximately 1,000 yd. per 10-hr. day.

The blast holes were put down with type S-49 Ingersoll-Rand drills served by portable compressors located on the berm of the cut at one side. From the start of the job exceptional care was taken to avoid injuring the tunnel lining or timbering.

Tunnel Lining Finally Removed—The power shovels also had to be handled with extreme care to keep from damaging the concrete tunnel lining. Working thus guardedly it was possible practically to strip the cover from the tunnel lining down to the springing line of the arch. The concrete portal at each end, and about 12 ft. of the concrete lining arch at one end and 18 ft. at the other end, were removed to eliminate any chance of a cave-in. Otherwise, the lining and timbering were left in place and the cut carried down to grade in the manner described. When the temporary track had been laid on that portion of the cut on the wide side, the tunnel lining and timbering and the balance of the excavation were removed with rail traffic on the new temporary track.

The project was under the direction of C. W. Johns, chief engineer of the Chesapeake & Ohio Railway Co. with H. L. Vandament district engineer in charge, and J. H. Staley resident engineer. M. I. Dunn, Jr. is engineer of the Huntington division and R. L. Wellman supervisor of bridges. Langhorne & Langhorne, of Huntington, W. Va., were the contractors on the project, with A. M. McLeod in charge as superintendent.

DEMOLITION of tunnel lining and timbering followed completion of cut to accommodate main-line traffic.

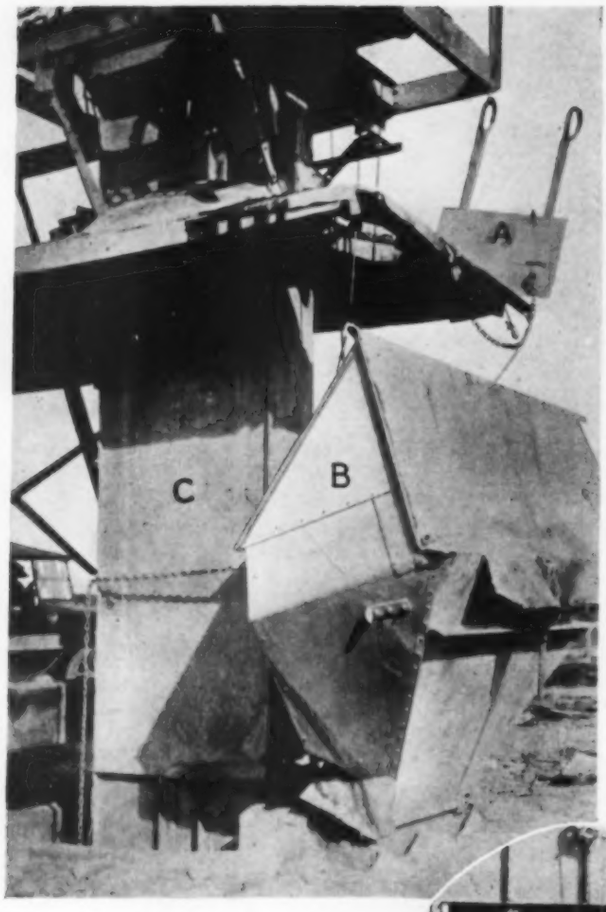
BULK CEMENT PLANT

Saves Time and Labor on Paving Job

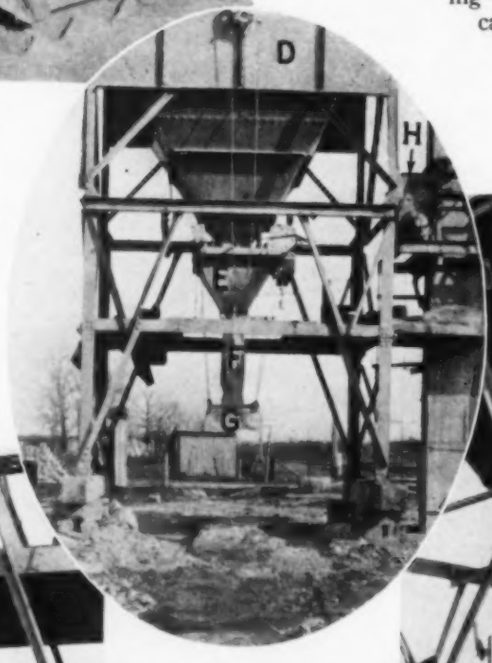
By D. B. LEVI

Engineer of Construction
Missouri State Highway Department

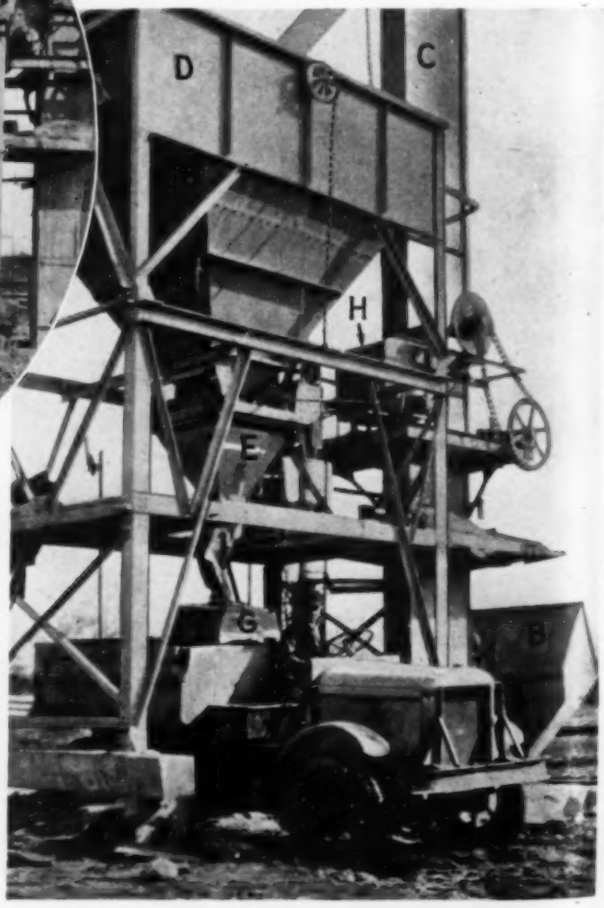
APPROXIMATE savings of 10 to 20 per cent on labor, of 20 to 40 sec. in loading a truck with two 6-bag batches of cement and of the difference in price between bulk and sacked cement were realized from the use, by the Regenhardt Construction Co., of Cape Girardeau, Mo., of a Blaw-Knox bulk cement unloading and batching plant on a 23-mile concrete paving job in Crawford and Phelps counties, Missouri. Ross H. McKee, project engineer for the Missouri Highway Department, was in charge of the work. T. H. Cutler is chief engineer of the department. The plant, powered by a 15-hp. gasoline engine, unloads cement from railroad cars by means of an automatic shovel machine, raises it in a 35-ft. vertical chain bucket elevator to a 21-ton steel bin, deposits it in a weighing batchmeter and passes it to a 10-in. diameter canvas tube on the end of which is fastened a countered sheet metal bell which spreads it over the aggregates. The complete operation requires only three or four men.

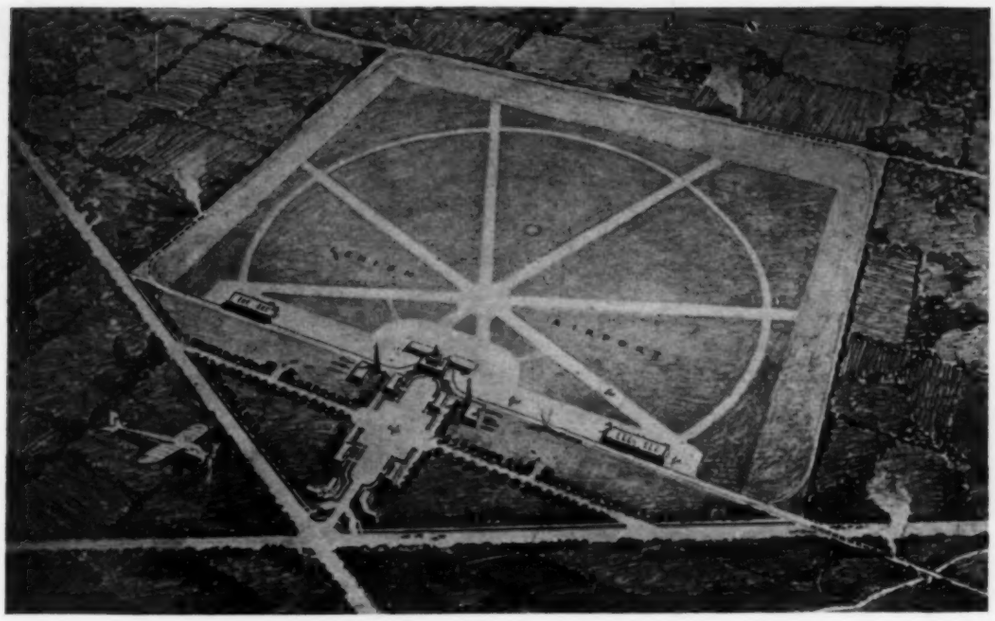


AUTOMATIC SHOVEL MACHINE (A), driven by 15-hp. gasoline engine (H), removes cement from railroad cars and deposits it into folding boot extension (B) which empties into bottom of 35-ft. vertical chute (C) where it is raised by a chain bucket elevator, discharged into a steel chute and delivered to a 21-ton steel bin (D).



WEIGHING BATCHMETER (E) directly below steel bin (D) receives cement through series of manually operated gates whence it is deposited into a 10-in. diameter canvas tube (F) terminating in a countered sheet metal bell (G) approximately 30 in. square and 8 in. high which easily spreads it on top of previously loaded aggregates.





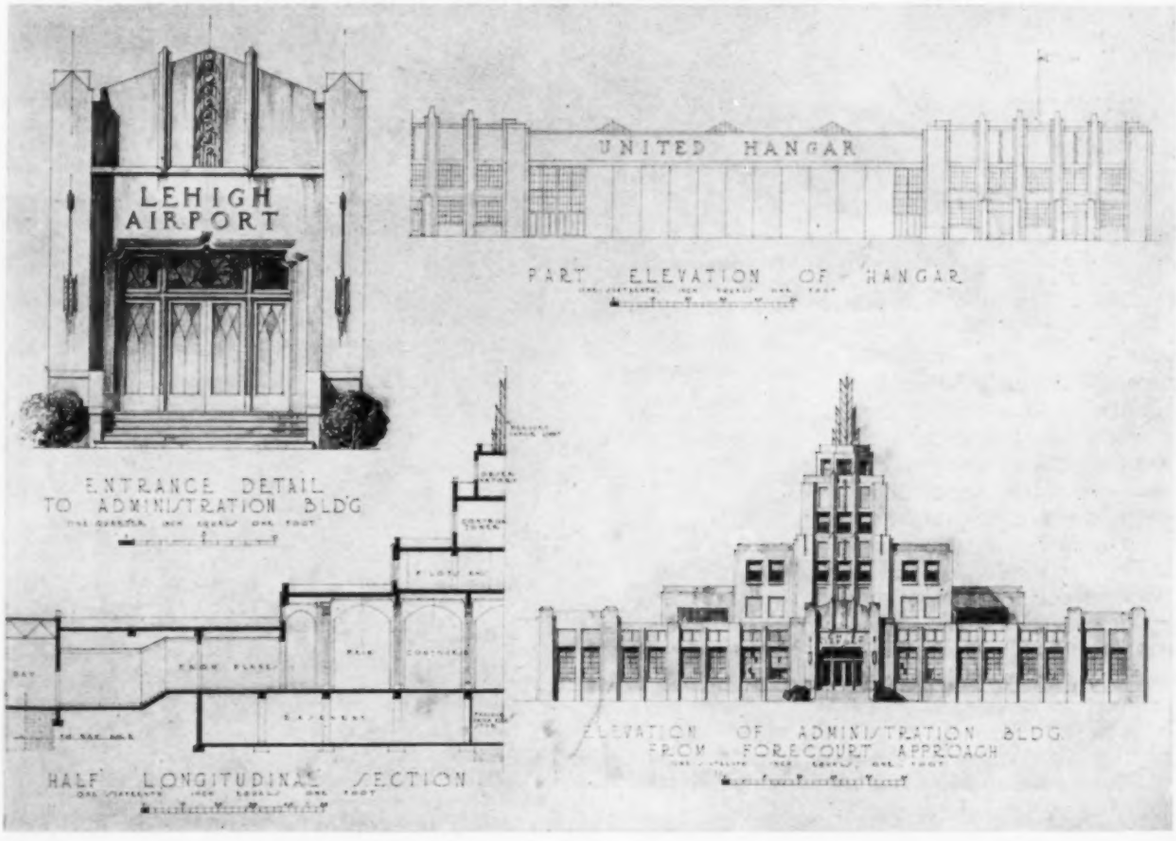
Second Design Prize Won by

RECTANGULAR AIRPORT

THE second award of $2,500 in the Lehigh Airports Competition, sponsored by the Lehigh Portland Cement Co., was won by C. Gifford Rich, architectural designer of Chicago, for his design of a modern airport serving a typical American city.

The plan calls for a rectangular flying field with all buildings grouped along one side in a triangular area formed by adjacent boulevards. The runways of the flying field are connected near their ends by a circular taxiing strip. The passenger terminal building has wing-shaped, covered loading and unloading platforms at either side and is crowned with a lighted pinnacle of modernistic design. Other essential buildings include a small hotel, stores, shops, a recreation building, and concessions. These are arranged around a plaza with ample parking space for automobiles.

The first prize design was illustrated on p. 35 of last month's issue of *Construction Methods*.



FOR MASS PRO D

Surface-Mix Method Found States for Large-Scale Roads at

THE surface-mixing method of building oiled roads increased last year in the western states to double the production of the year before. During the 1929 season more than 1,600 miles of this type of road surface was built in the eleven western states as compared to slightly more than 800 miles built in 1928 in the same territory. Low cost for the quality of surface produced, a type of construction that lends itself to rapid, large-scale production and the advantage of keeping the highway open for traffic during construction find this type of road increasingly popular for mileage in secondary systems.

Successful use of this method for producing oil surfacing is adapted to any crushed rock or gravel road which is in need of additional new material to restore its thickness or which, because of lack of binder or climatic conditions, is not tightly bound. The surface-mixing method is particularly adapted to treatment of a loose surface but, in common with other methods, a thoroughly compacted base course is essential. One special advantage of this system of oiling is that it permits the passage of traffic during the construction period. The loose surface maintained during construction has the added advantage of requiring slow driving whereas oil treatment on a compacted surface encourages rapid driving with accompanying spattering of oil on vehicles.

During the last three years the use of the method has spread rapidly throughout the western states and in-

PREPARING SURFACE for application of oil. Gravel or fine crushed rock surface is scarified to a depth of 1½ to 3 in., depending on the thickness of treatment to be given, and is then leveled to approximate grade in case of any serious irregularities.

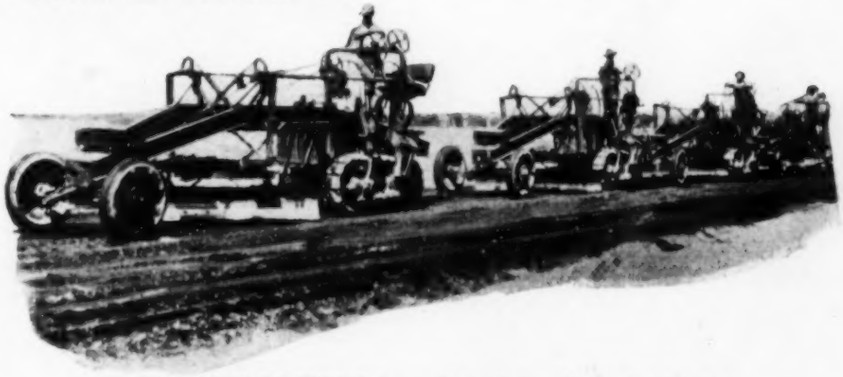
PROPER MIXING is of prime importance. Process must be continued until material is of uniform color, indicating that oil is evenly distributed. This will allow compacting to a uniform texture. Notice in this photograph mottled appearance of material before mixing is completed.

DISKING *(right)* immediately after each application of oil. A disk cultivator (some states also use a spring-tooth harrow) follows oiler and gives a preliminary mix to oil and surface material. This step is particularly important if road is being kept open to traffic so that cars do not travel on fresh oil surface.

OIL APPLIED from pressure distributor. Two or three applications usually constitute the treatment, each consisting of about ½ gal. per square yard of surface. Some methods call for heavier application at the sides than in the center.

DUCTION

Effective in Western Treatment of Oiled Low Cost



MASS PRODUCTION in surface-mixing illustrated by the use of four Spearwell graders working in tandem on surface-mixing a stretch of state highway in New Mexico.

SPREADING TO PROPER CROWN after mixing is completed. Material is spread by grader to form surface and is compacted by traffic. During compacting, dragging and light blading are continued to maintain surface. Following these construction steps and thorough compacting by traffic, the maintenance work is quite similar to other types of oiled roads.

numerable variations of the details in the general scheme have developed in different localities. Each state department has modified details to fit local conditions and often experimented with new developments. However, the basic requirements as to the economic use of this type of surface in a highway system, the condition of roadbed for successful treatment and the general method of construction are approximately the same.

The state of California has probably built more miles of this type of road than any other state, and the steps in construction developed by the California Division of Highways are quite typical of the general method. The details of the process and equipment used, of course, may vary from those employed by other states to produce the same general type road surface.

Step-by-Step

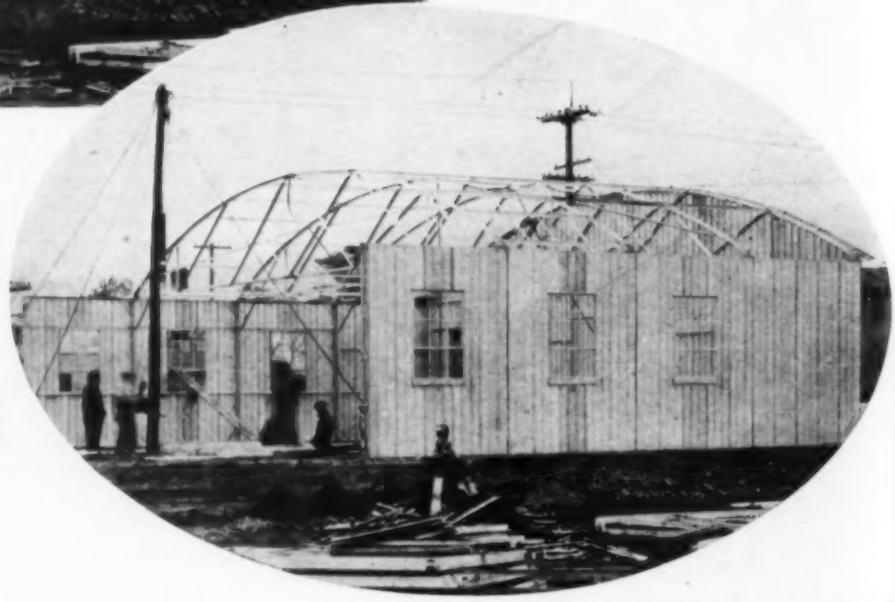
Erecting an ALL-METAL

FOUR days sufficed for the International Derrick & Equipment Co., of Columbus, Ohio, to complete the erection at Middletown, Ohio, of a 50x60-ft. all-metal airplane hangar. Built-up sectional panels of rust-resisting Armco ingot iron

1 TUESDAY, 3:10 P. M.—Putting up first sections of all-metal hangar *(above)* 60 ft. long and 50 ft. wide with a clearance of 12 ft.

2 WITH SEVEN PANELS IN PLACE, end truss, which has been previously assembled on the job, is hoisted into position with aid of gin pole.

3 TWO HOURS LATER. Girders to support roof are quickly put in place.

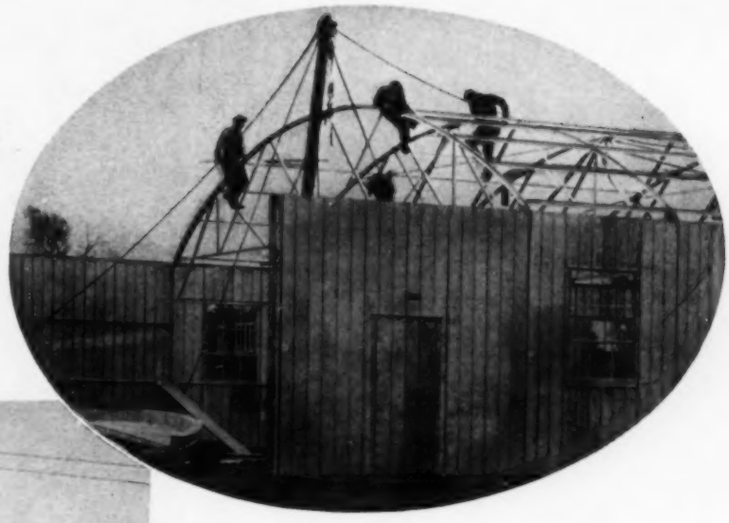


4 WEDNESDAY, 9:20 A.M.—Only a few more sections to go and walls will be completed.

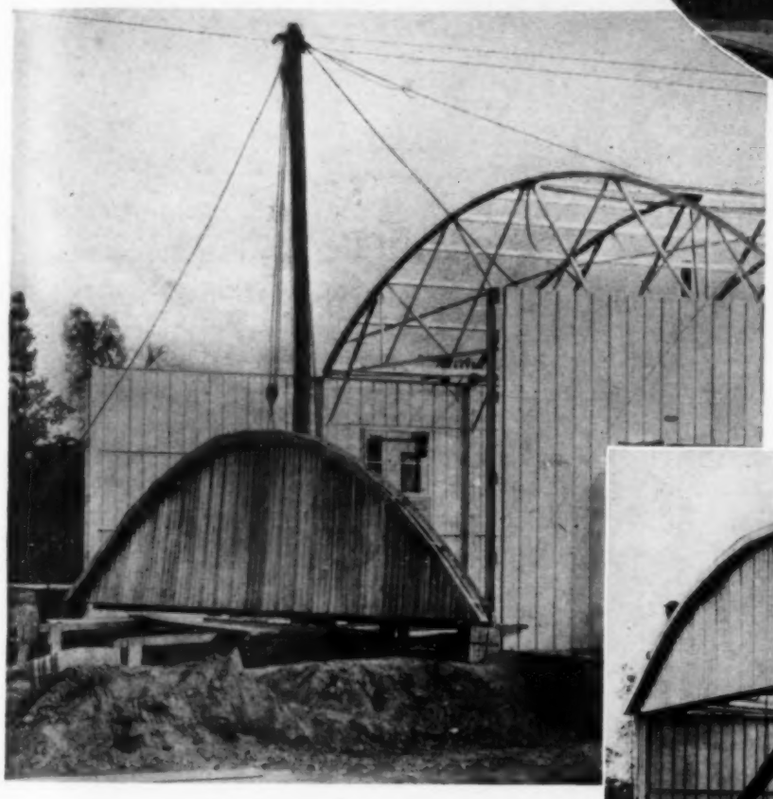
Field Methods

AIRPLANE HANGAR in 4 Days

sheets simplified the field operations. The accompanying photographs illustrate the successive steps in building the structure for Wedekind & Schmidlapp, Inc., operators of a local flying service.



5 WEDNESDAY, 11:30 A. M.—All girders except one in place *(above)*. Workmen put in braces before lunch.



6 WEDNESDAY, 3:20 P. M.—Second end truss *(left)* is hoisted to position and hangar is ready for its roof.

7 THURSDAY, 11:30 A. M.—Corrugated roofing *(right)* is being laid by workmen.

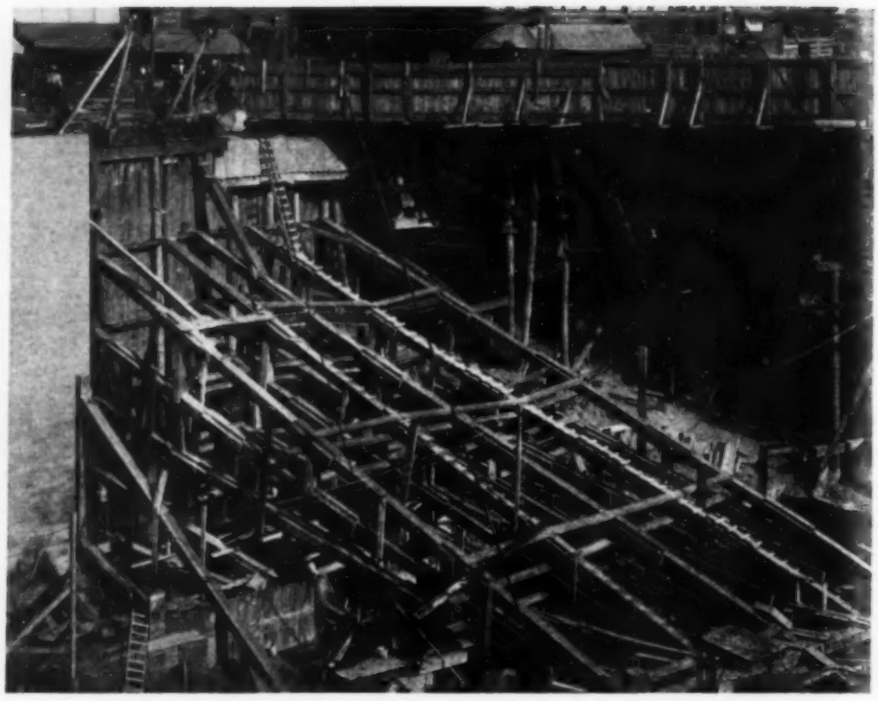
8 FRIDAY, 11:45 A. M.—Doors hung and roof on (*left*), hangar is all ready for its concrete floor.

SHORED SHEETING

Open Way for Side-

SHEET piles, round piles, and timber bracing formed the combination of job utilities upon which the Bates & Rogers Construction Co. placed full dependence in constructing a three-level subway under Ontario Street for the east approach to the Cleveland Union Passenger Terminal. On the north side of Ontario Street lies level land, but on the south side the land slopes away to the meandering Cuyahoga River 93 ft. below. The railway tracks, as they approach the terminal from the east, cut into this slope and under the thoroughfare itself for a distance of 825 ft. A reinforced concrete retaining wall which forms the inside wall of the subway structure extends 200 ft. beyond the roofed portion.

Steam and traction tracks entering the terminal are at a level 41 ft. below the street. A deck above them provides for a future city subway, while a depressed track crossing 20 ft. beneath affords an outlet for a proposed rapid transit extension into Huron Road. For the present, the upper deck is covered with a 20-ft. fill. Excavating 150,000 yd. of sand and clay, shoring the bank along the north side of the cut, and taking care of vehicular traffic and underground utilities presented numerous difficulties to the contractor.

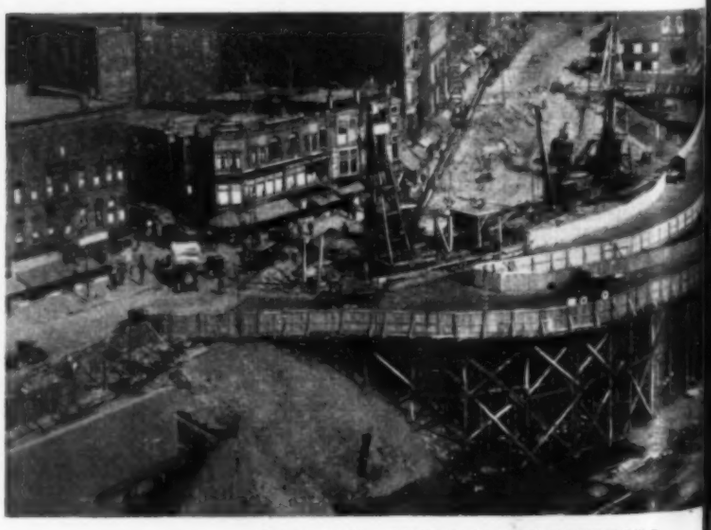


HEAVY SHORING of 14x14-in. timbers spaced at 10-ft. intervals holds the steel sheet wall of 56-ft. spliced piles.

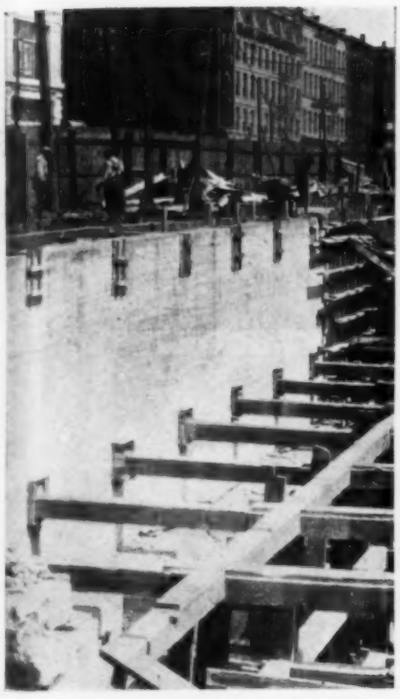
BRACING of cut for depressed track (*above*) is placed as excavation goes down.

Two temporary trestles erected to bypass traffic and to preserve connections with a lower thoroughfare contained about 20,000 lin. ft. of wood piles 55 ft. long and a total of 500,000 ft., b.m., of timber. An additional 18,000 lin. ft. of piles, driven before excavation, supported the telephone, gas, steam, and electrical conduits.

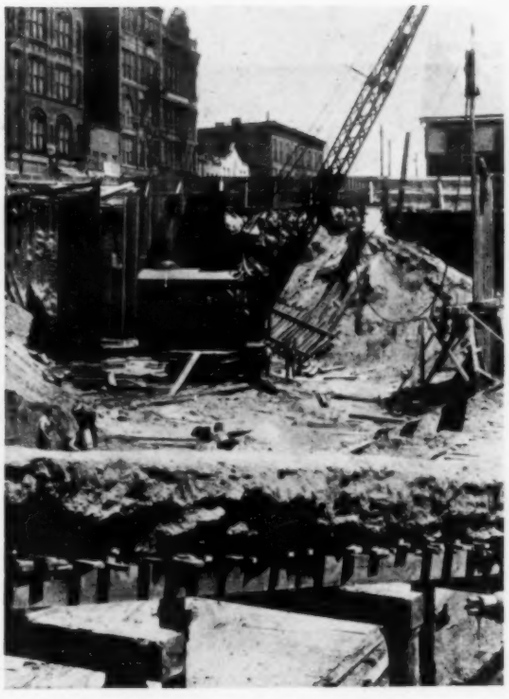
The entire job required 4,000,000 lb. of Lackawanna steel sheet piling, of which 85 per cent was arch-web section. To hold the earth bank during construction of the concrete retaining wall, the contractor drove 56-ft. spliced sheet piles in 28-ft. lengths. Driving through the sand and clay forming the substrata at this location proved extremely hard. Twenty to 30 piles were set in a group, and the piledriver worked back and forth along the line of piles. Using 28-ft. lengths made it much easier to lift and thread the piles than would have been the case with full 56-ft. lengths.



PILETRESTLES (*right*) carry street traffic during construction of three-level subway structure.



STRUTS THROUGH RETAINING WALL are removed, and holes are plugged with concrete after backfilling behind wall is completed.



DRIVING STEEL SHEET PILES preparatory to excavating for depressed track

American locomotive crane set the steel sheet piles, which then were driven by an Osgood crawler crane handling a McKiernan-Terry 9-B-2 steam hammer.

The top 35 ft. of soil was coarse yellow sand. Beneath this coarse sand was a layer of water-bearing sand varying in thickness from a few inches to 3 and 4 ft. The balance of the excavation and piledriving was in stiff blue clay. Two 1¼-yd. Erie steam shovels and a Barber-Greene bucket loader were used in excavating.

As the depth of excavation for the depressed track varied in its descent and passage under the terminal tracks, sheet piles from 13 to 48 ft. long were driven to retain the earth walls of this cut.

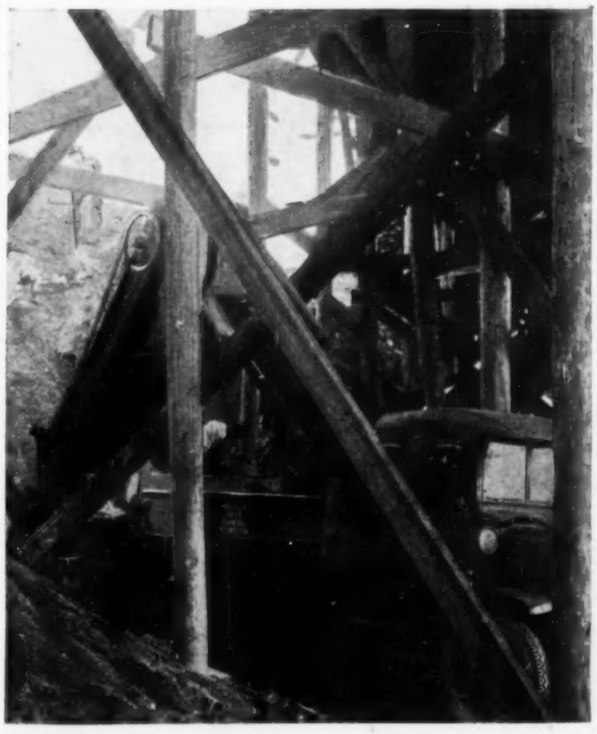
A 1-yd. Smith paving mixer poured the 30,000 cu.yd. of concrete in the retaining wall and bridge structure. Trucks delivered batched material from the

AND PILE TRESTLES

hill Bridging Work

The sheet-pile wall required 500,000 b. ft. of timber bracing. As the excavation of the bank went down, 14x14-in. timber struts were placed at 10-ft. intervals along the wall. One of the photographs shows the number and length of the struts used and indicates the flat slope at which they were set. At the request of the contractor, the engineers permitted the walls and floor of the depressed track to be constructed first with a notched corner at the top of the wall next to the bank. The timber braces were set in this notch, and the concrete mass served as a footing block.

Two turntable piledrivers with leads 55 and 70 ft. high drove the round wood piles, using Vulcan No. 1 steam hammers. An



BUCKET LOADER (*above*) excavates sand between piles of vehicular trestle.

TRESTLES (*left*) contained about 20,000 lin.ft. of wood piles 55 ft. long and a total of 500,000 ft. b.m. of timber.

dealer's yard. Concrete in the wall was placed around the timber braces and the braces were removed and the holes plugged as backfilling progressed.

C. T. Smith superintended the work for the Bates & Rogers Construction Company, under the supervision of L. C. Rogers, Cleveland district manager. For the Cleveland Union Terminals Co., owner of the project, those in charge were H. D. Jouett, chief engineer, and N. H. Suloff, engineer of construction.

···· SINCE 1893

METROPOLITAN
BESSEMER
AND OLEAN

METROPOLITAN PAVING BRICK

VITRIFIED BRICK

Since 1893 Vitrified Brick Has Carried Heavy Traffic Past Buffalo's City Hall

Horse drawn vehicles first traveled this vitrified pavement now lined up with automobiles. Many changes have occurred in transportation methods but today vitrified brick still is a most economical road surface both in the city and on the open road.

Maintenance on this particular street has been exceptionally low and is one of the big reasons why Vitrified Brick pavements are a good investment for any community.

Metropolitan, Bessemer and Olean paving block comes from America's largest producers of paving brick. If you want a quality pavement, free from glare, smooth and safe—specify any of the three brands named.

Actual figures covering maintenance cost on installation shown will be sent to anyone interested.

Structural Clay Tile

"METEO" Face Brick

Metropolitan Paving Brick

"METEO" Filter Floor

COMPANY·CANTON·OHIO·U·S·A·

Fourth of a series of articles on the $325,000,000 construction program for flood control in the Mississippi Valley

The Defense Against OLD MAN RIVER-IV

By ROBERT K. TOMLIN
Editor of *Construction Methods*

How Lapped Revetment Slabs of Concrete Are Cast and Sunk

LAYING a concrete shingle roof of gigantic proportions underwater on the sloping bottom of a river describes the general principle involved in one of the methods of revetment that the Corps of Engineers, U. S. Army, is employing to protect the banks of the Mississippi from the inroads of undercutting currents. Property damage caused by the undermining and caving-in of unprotected river banks, with a consequent washing away of valuable farm land and frequent shifts in the course of the river, has been extensive.

Early types of revetment for bank protection were of the willow mat type. Depletion of the supply of willows readily available at all river stages for revetment work, however, has brought about the development of two forms of concrete revetment, the articulated slab mattress (to be described in a forthcoming article) and the lapped concrete slab with which the accompanying illustrations and notes deal. This revetment is essentially a subaqueous mat made of individually placed precast overlapping concrete slabs each 6x11 ft. in plan and 4 in. thick, reinforced with electrically welded mats of No. 9-gage galvanized wire spaced 8 in. on centers in both directions.

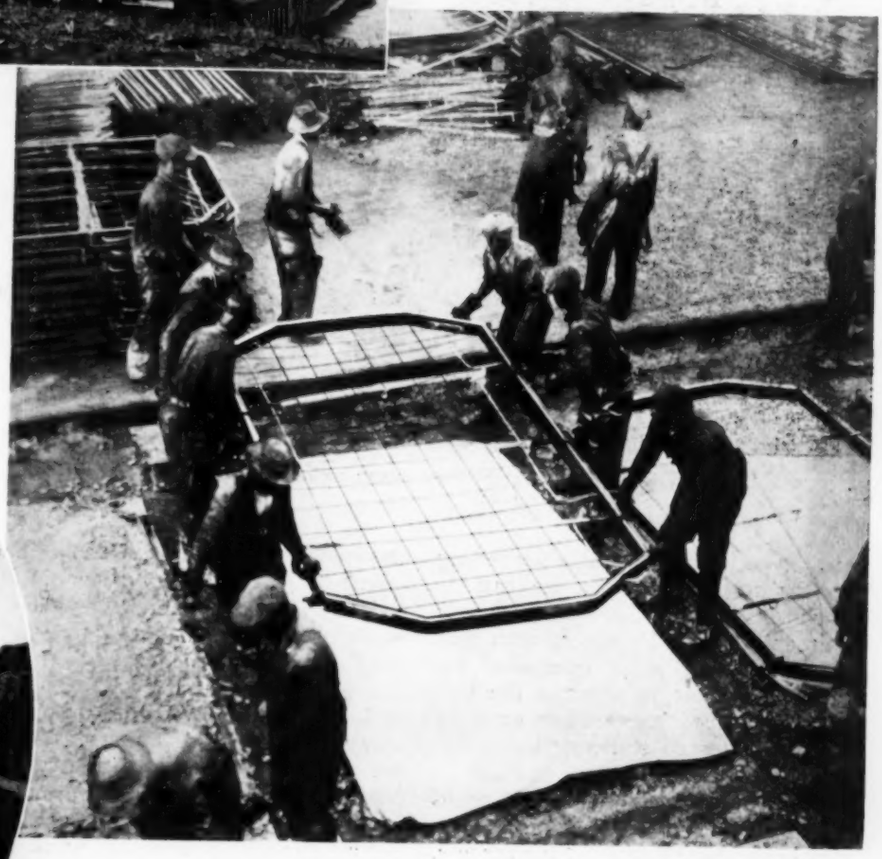
The slabs, each weighing 3,300 lb., are cast at a floating plant, delivered by barges to the point selected for revetment and sunk by special floating equipment. In the sinking operation the slabs are guided to place on the river bottom by cables extending from the barges of the sinking plant to heavy concrete header blocks serving as deadmen, as illustrated in the sketch on page 51.

Casting Plant—The casting plant comprises a fleet of barges moored along shore at Hickman, Ky. The various floating units for the mixing and casting operations and the supply of steel reinforcement, cement, sand, gravel, and steel forms are grouped to form a central channel or canal over which extend horizontal booms, 30 ft. long, with traveling bottom-dump buckets, from two Koehring 27-E paving mixers served by overhead bins and Blaw-Knox weighing batchers and inundators. Along this channel a cable from a hoisting engine drum pulls barges carrying rows of forms for the concrete slabs. The barges are spotted to bring successive rows of forms under the mixer booms. The bottom-dump buckets then run from the mixers out along the booms and deposit concrete within the forms

THE REASON FOR REVETMENT. River banks, undercut by the Mississippi's swift current, cave in and are washed away, thus destroying valuable farm land.

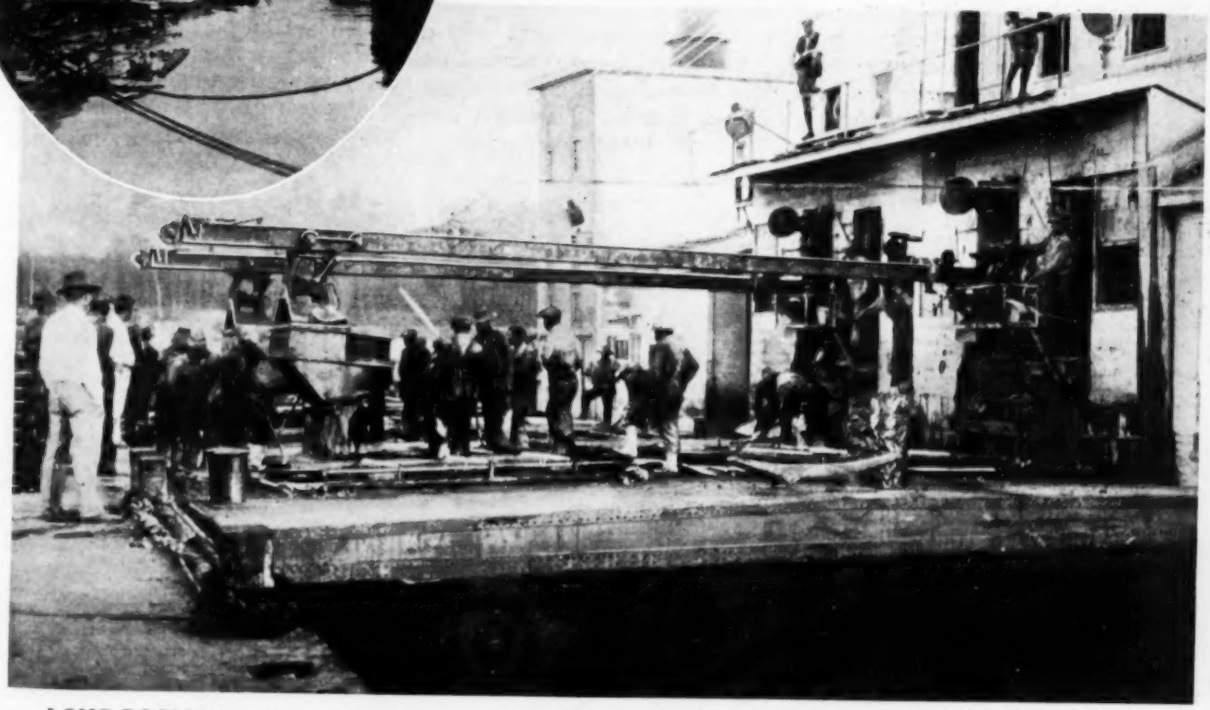
FLOTILLA of barges *(left)* forms slab-casting plant at Hickman, Ky.

PAPER SHEETS *(below)* separate concrete slabs cast in stacks eleven high with aid of steel forms.

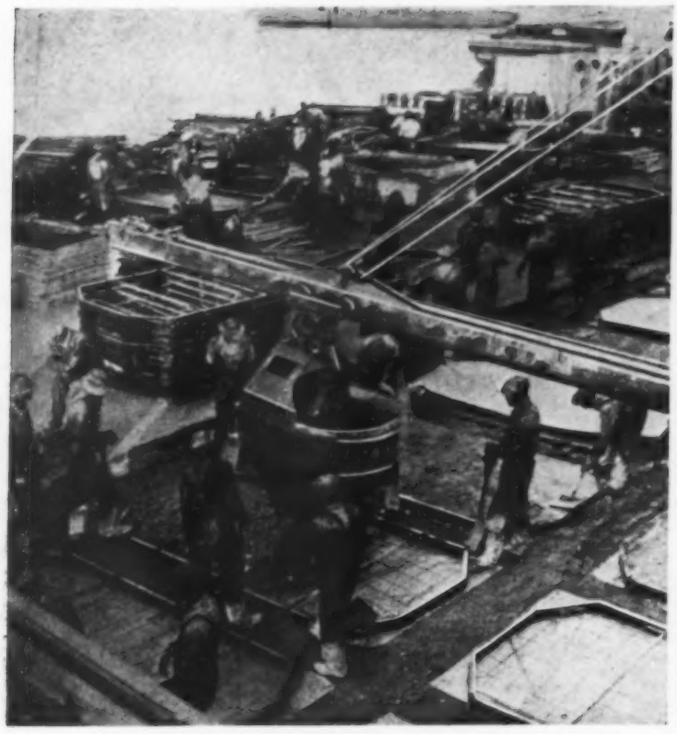


on the barge, which is then towed ahead a few feet until another row of forms is in place under the booms ready for concreting. The operation is essentially an adaptation to floating plant of methods and equipment that are standard in concrete paving practice.

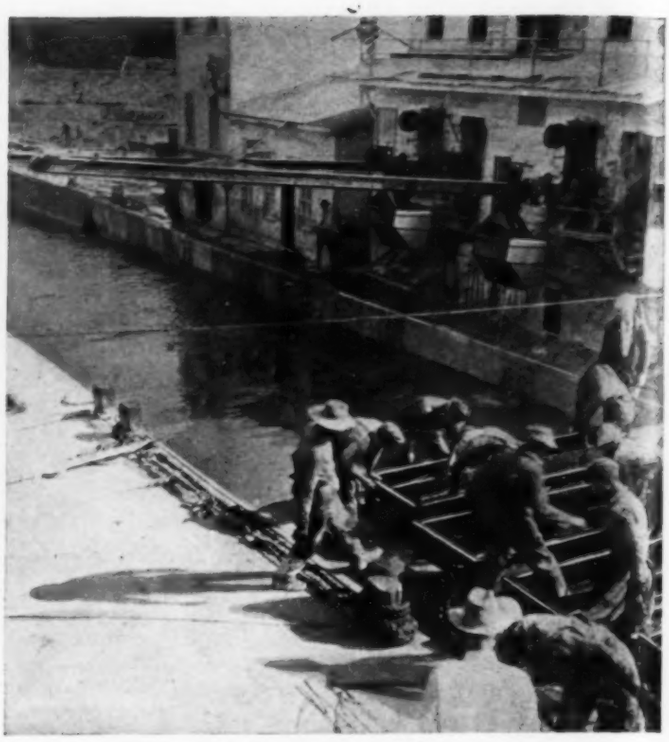
To utilize to the fullest the limited



LONG BOOMS from two paving mixers carry traveling buckets which discharge concrete into slab forms on barge. CHANNEL *(in oval)* for barge is provided under mixer booms.



FILLING FORMS for flat slabs from mixer bucket on 30-ft. boom.



HEADER BLOCK FORMS being assembled and oiled prior to concreting.

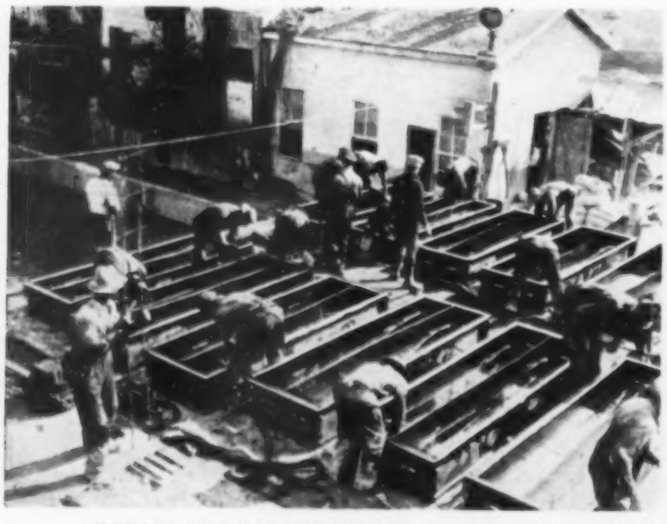
area on each barge available for setting up the forms the slabs are cast in stacks eleven or twelve slabs high, one slab on top of the other, with two sheets of kraft paper interposed between each pair to separate the slab units in each stack. One barge usually accommodates 26 stacks or about 286 individual slabs.

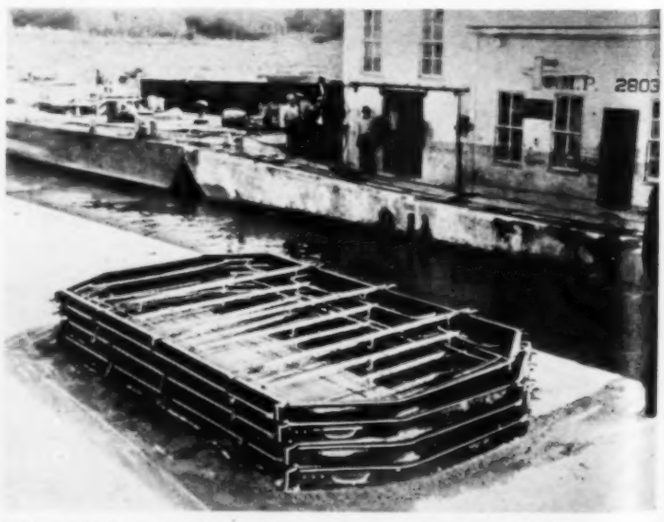
The forms for the 6x11-ft. slabs are of pressed steel in four pieces with simple clamping devices at the corners. Removable spacer bars, with hooks, are set temporarily in them to center built-up mats of wire mesh reinforcement in the concrete. The top surface of each slab, as poured, is smoothed off by a screed riding on the tops of the steel forms. After screeding and laying the two sheets of paper on the finished slab another form is set directly on top of the one in place, ready for the next pour on the return trip of the barge beneath the mixer booms and buckets. The barge makes as many trips past the mixers as there are slabs in each stack on the casting barge—generally 11 or 12. Forms are removed in from 5 hours to one day but a slab may not be picked up before four days.

For handling by cranes pick-up loops of wire cable are concreted into one edge of each slab and to control each slab during its subaqueous journey along the guide cables from the sinking plant similar wire loops are formed at each corner and are clipped loosely to the guide cables by means of U-bolts to permit the slab to slide down the cables into place and to form an overlap.

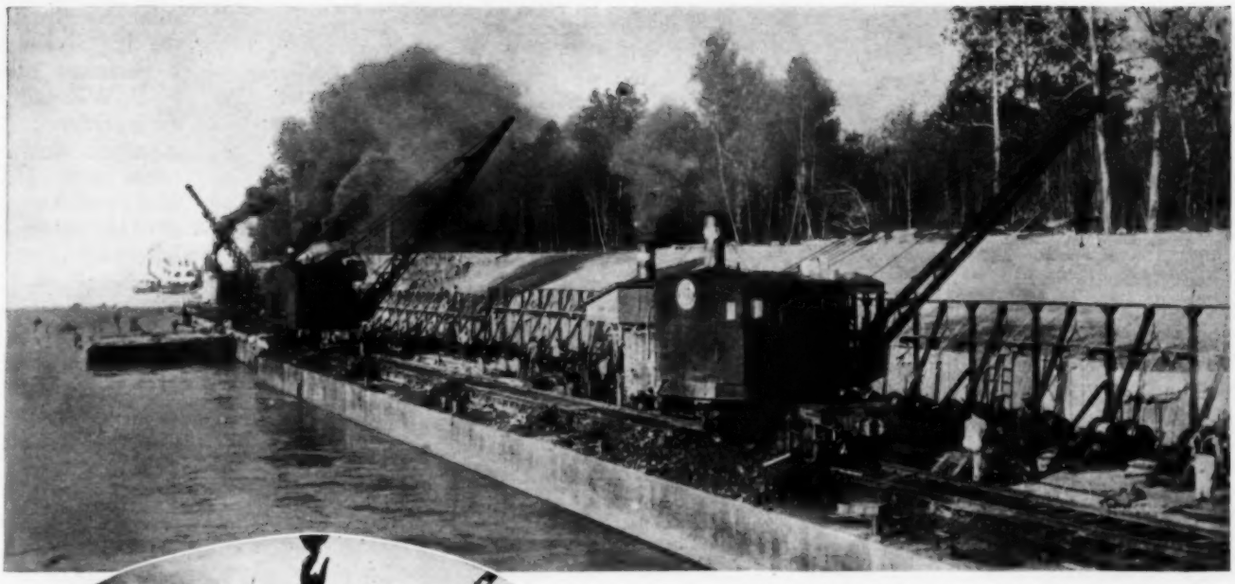
Sand and gravel for the concrete obtained up the river by a Diesel-powered hydraulic dredge is delivered by barges and transferred to the material bins over the mixers by clam-shell buckets on a pair of locomotive cranes. All primary equipment in the plant, such as mixers and material-handling cranes, is in duplicate to forestall a shut-down of operations in the event of accident to one unit.

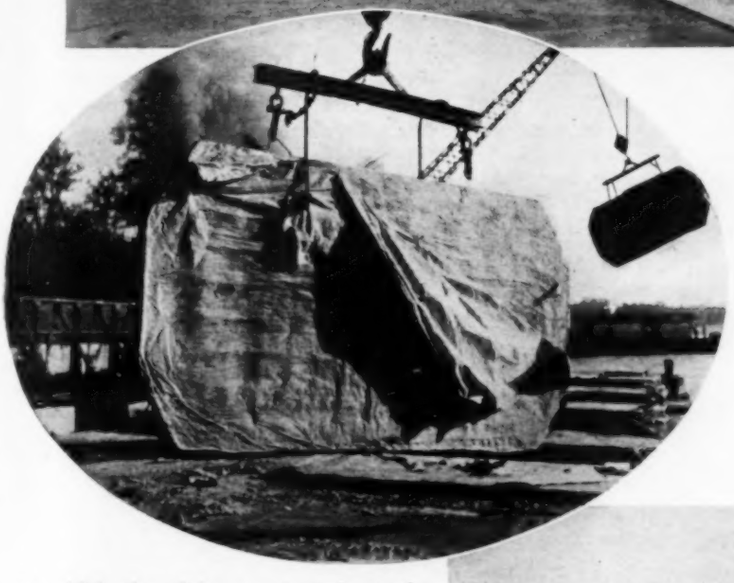
Sinking Plant—The sinking plant.





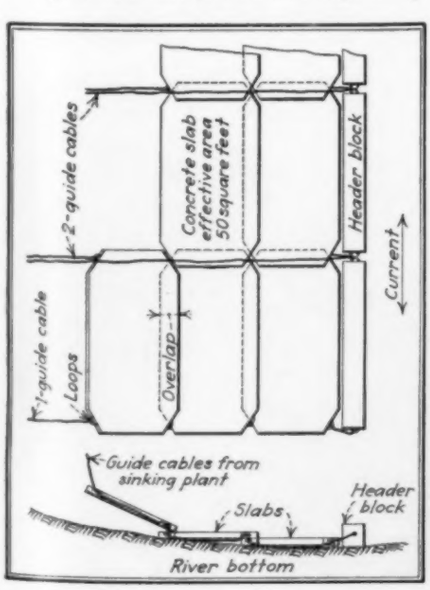
FORMS OF TWO TYPES. Those at left are for the header blocks and those at right for flat revetment slabs, cast in stacks, with spacer bars holding reinforcement.



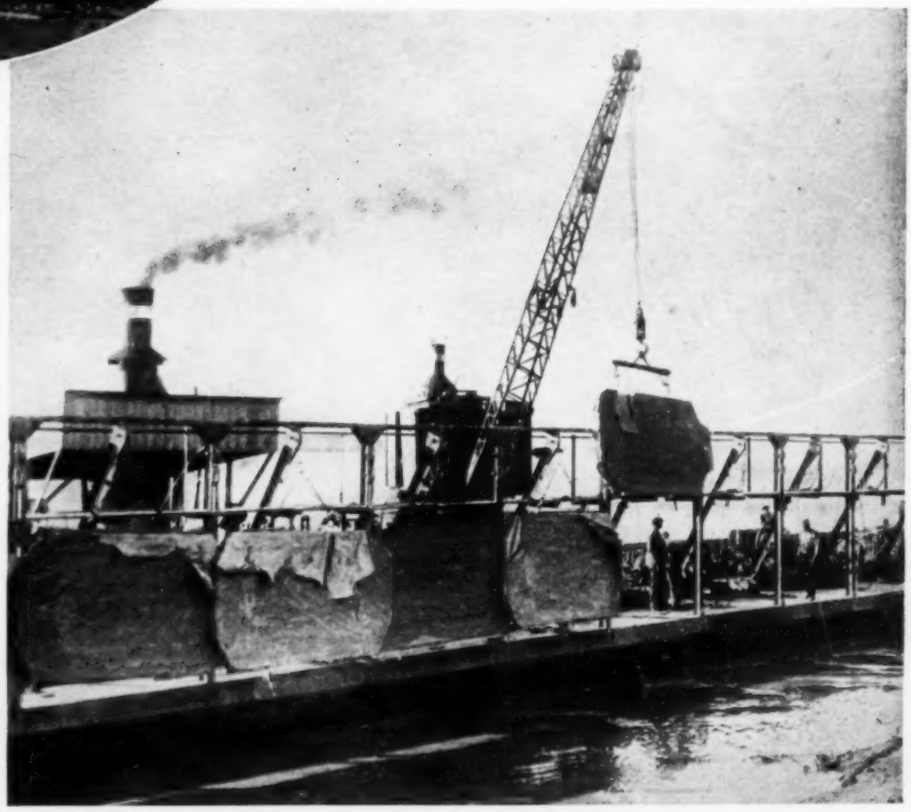


AT SINKING PLANT *(above)* four locomotive cranes pick slabs from supply barges *(in oval)* and deliver them to long steel-frame scaffold for lowering to place on river bottom. Note paper sheet separator adhering to slab.

to which the slabs are towed on the same barges on which they were cast, is also a group of barges specially equipped. Its primary units are two barges, each about 250 ft. long, carrying a structural steel frame from which the slabs are lowered to the river bottom. Guide and lowering cables pass over sheaves at the top of the frame to rows of American Hoist & Derrick and Flory one-drum and two-drum hoists served by line shafting. Four locomotive cranes (2 Industrial Brownhoists and 2 McMylers) operating on track extending the length

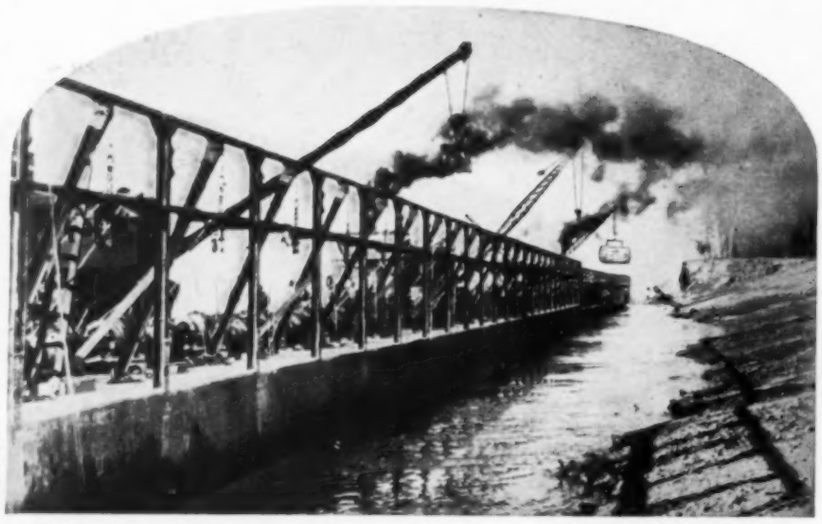


METHOD of securing overlap on slabs sunk with guide cables.



READY FOR LOWERING. Slabs on rack ready for their trip to the river bottom along guide cables.

of the barges, pick the 3,300-lb. concrete slabs from the supply barge and swing them over to the steel frame where they are hung from cables to the one-drum hoists. The wire rope loops at the corners of each slab are then clipped by U-bolts to the guide cables which extend down to the header blocks on the river bottom. The slabs are then lowered to place by the one-drum hoists.



STEEL FRAMES on which the 3,300-lb. concrete slabs are hung prior to sinking.

A spreader bar with trip hooks spaced to fit the wire cable loops in the edge of each slab, as pictured in detail herewith, makes it possible for the locomotive cranes to pick-up and release the slabs with great rapidity.

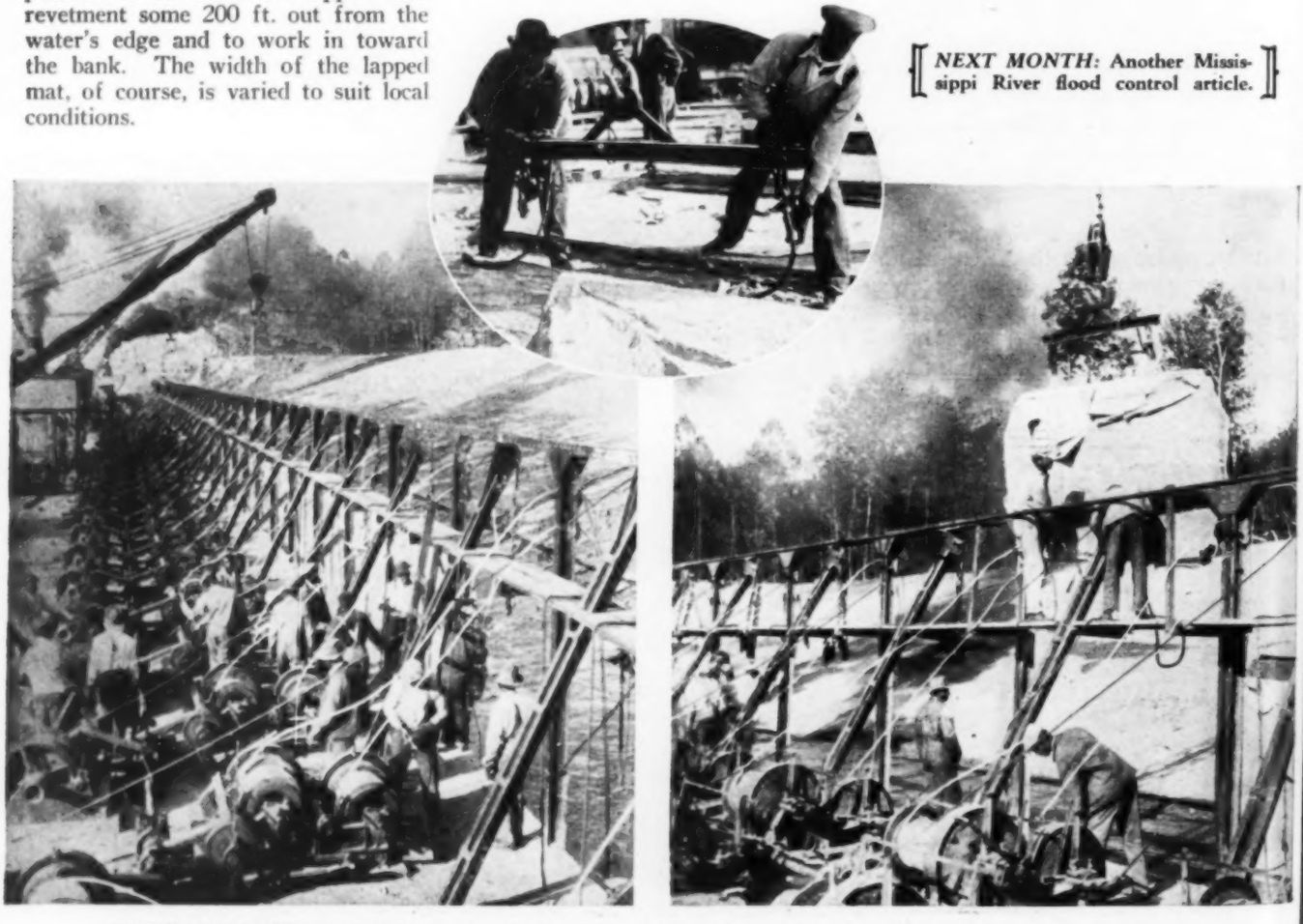
The first operation in the sinking is to place the concrete header blocks, with their guide cables, on the river bottom. These blocks are each 16-in. square and 9½ ft. long. The general practice is to start the lapped slab revetment some 200 ft. out from the water's edge and to work in toward the bank. The width of the lapped mat, of course, is varied to suit local conditions.

Above the water line the river bank is paved with a monolithic sheet of concrete by methods to be described in a later article. The galvanized wire cables on which the submerged lapped slabs are strung are carried up and anchored into the concrete bank paving.

At the time the slab casting and sinking operations were inspected the floating plants were located in the first field area of the Memphis district of the U. S. Engineer Department, Lt.-Col. F. B. Wilby, district engineer; T. T. Knappen, area engineer; and H. G. McCormick engineer at Hickman, Ky. The mixing plant is in charge of P. A. Wilson, assistant engineer, with H. L. Shannon as field superintendent. Sinking operations are directed by H. O. Warlick and J. B. McKenzie. Bank paving is handled by G. A. Robinson.

The movement of the sinking plant toward shore as successive rows of slabs are sunk is accomplished with the aid of a mooring barge held perpendicular to the bank by cables and equipped on its downstream side with an I-beam trolley rig holding the upstream end of the sinking plant. A line from a hoist drum pulls the floating plant along the I-beam trolley track on the mooring barge.

[*NEXT MONTH:* **Another Mississippi River flood control article.**]



ROWS OF HOISTS, both single and two-drum, control guide cables and lowering cables which pass over sheaves on steel frame. PICKUP DEVICE *(in oval)* engages wire loops in slabs.

Sewer Contractor Employs

FLEXIBLE PLANT

for Concrete Delivery

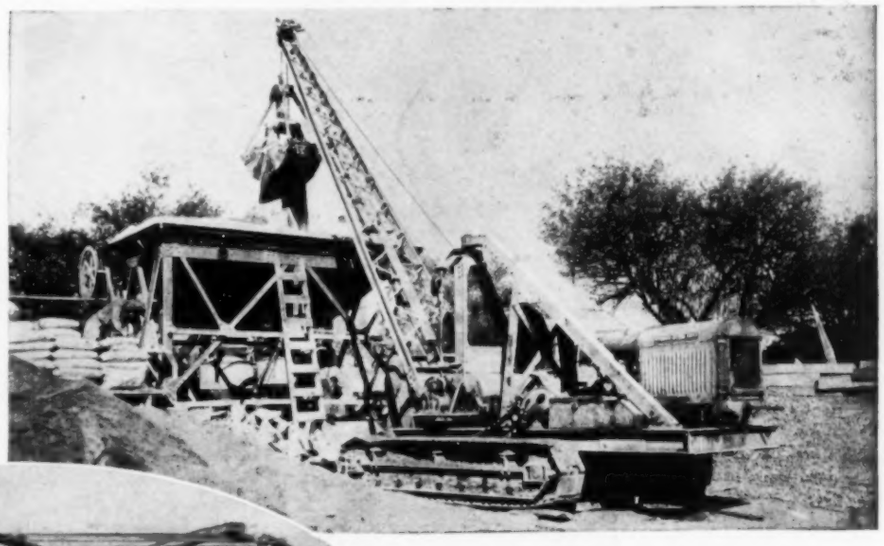
By R. D. BAKER

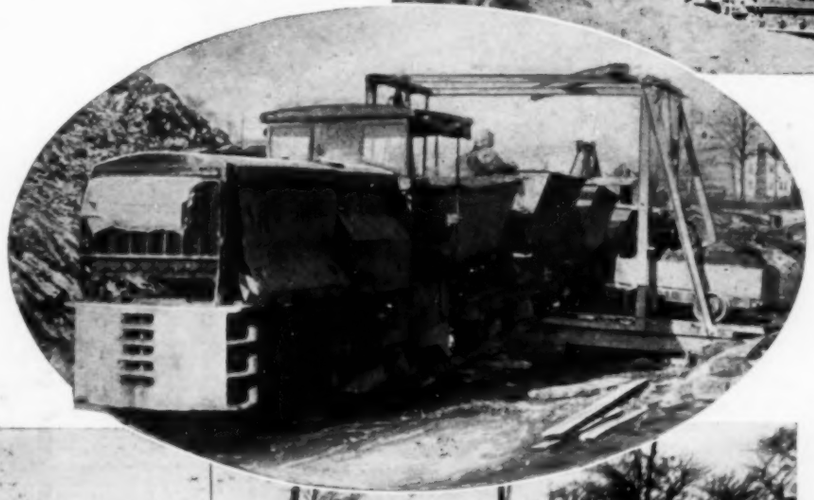
Contractor
Detroit, Mich.

AN electric winch operating clay knives to trim the invert subgrade of the sewer, a central mixing plant, and a traveling hopper and chute running on the rails of the narrow-gage track were three features of the construction of the Frisbee Avenue sewer, Detroit, Mich. The sewer consists partly of 8x8-ft. double-box reinforced-concrete section and partly of 10½-ft. and 13-ft. circular sections.

Excavation was carried on with Northwest draglines, and trimming and shaping of the bottom of the invert was done with clay knives. An electric winch mounted on the last invert pulled the clay knives for trimming the invert excavation to line and grade.

Concrete was hauled from the central plant in 24-in. gage side-dump cars. An unusual device facilitated pouring from the cars. This device consisted of a carriage mounted on underslung trucks and counterweighted to balance the weight of the attached chute. The locomotive pulled cars on to the carriage, and the cars dumped into a hopper feeding the chute.





TRACTOR-CRANE charges low bins with ¾-yd. clamshell bucket. Elevating skip on ¾-yd. electrically operated mixer makes it possible to use low bins. This plant is compact and economical. SIDE-DUMP CARS *(left)* are pulled on to movable carriage and are dumped into hopper feeding chute on far side. On this side is small loaded car which counterbalances weight of chute.

CHUTE FROM CARRIAGE delivers concrete to sewer forms. Dragline excavates trench. No outside forms are used on invert of circular sewer sections, clay being trimmed to neat line. Inside wall and arch forms consist of semicircular steel rings, spliced at springing line and covered with beveled lagging.

The electrically-driven ¾-yd. Koehring mixer had an elevating skip which permitted placing the charging bins low enough for a small Bay City tractor-crane with a ⅜-yd. Owen clamshell bucket to handle the concrete materials.

The sewer is being built for the City of Detroit, through its Department of Public Works—John Reid, commissioner, and Perry A. Fellows, city engineer. Designs were prepared by the Department of Sewer Design with R. R. Reom, assistant city engineer, in charge. Construction work is laid out by the Survey Division under W. Starkweather, assistant to the city engineer, and John Facchinewti, chief of field parties. Inspection is under Fred. J. Legg, engineer of inspection, and Ed. Mahon, chief of the sewer division, the chief district inspector being Ira Parker, and the chief inspector on the job, Ray Murphy. L. G. Davis is superintendent in charge of the work for the writer, who is contractor for the sections described.

PRECAUTIONARY
Safeguard Main-
During Railroad Four-

ROCK CUT (*above*) is excavated to grade as work advances, drilling and blasting of end face being carried down in lifts from top of cliff.

WARNING of approaching train (*left*) is given to shovel crew by conductor, who sounds air whistle. Conductor's house is at left; man in distance, is holding hand on whistle tube.

STEAM SHOVEL (*right*) working against end face of cut, loads blasted rock into dump cars on dead-end track behind. Two dead-end tracks here reduce time lost in switching loaded and empty cars.

METHODS of blasting and handling rock excavation which safeguard the two existing tracks and an installation of cross-overs with interlocking switches and signals tied into the railroad's block signal system are the outstanding physical factors which enable the Walsh Construction Co., of Davenport, Ia., to add two tracks to a 10-mile portion of the New York Central Railroad Co.'s main line along the east bank of the Hudson River without any interruption to a train service aggregating 130 movements a day—75 per cent of them during working hours. Added to these more tangible factors are the abstract qualities of skill, patience, and constant vigilance on the part of the contractor and of the commendable co-operative spirit among the three parts of that eternal triangle—engineering department, operating department, and contractor.

The contract now being completed by the Walsh Construction Co. is the second to be awarded to this concern, an adjoining 10-mile double-track section to the south having been widened to four tracks in 1928-29. Work on the present widening started May 9, 1929. Excavation for this section, as originally planned, amounted to approximately 350,000 cu.yd., nearly all rock. An additional through cut made necessary by subsidence of a new fill on unstable river bottom will increase the quantity of excavation to more than 500,000 yd. and will extend the period of construction beyond the contemplated finish date of April 29, 1930.

Description of Project—The section under construction extends from Mile Post 62 to Mile Post 72, distances measured from Grand Central Terminal, New York City. Approximate limits of the project are the towns of Chelsea on the south and Poughkeepsie on the north. Alternate cuts and fills characterize the work on this portion of the line, solid rock hills extending to the water's edge being interspersed with bays and creek mouths jutting inland. Excavation and fill balance closely on the original plan; excess rock from the additional cut will be hauled to start fills on a future 5-mile four-tracking project north of the present work. The railroad company hauls and dumps this material.

The most dangerous and exacting part of the work was the cutting back of solid rock cliffs to provide space for the two new tracks. On the north

MEASURES
Line Operation Tracking Work

half of the project the rock was mostly shale lying at a steep angle which allowed the strata to project from the face of the cliff until, at some points, they actually overhung the northbound track. The original cuts had been made in the days when no sloping of rock cuts was considered necessary. Toward the south end of the section, the formation was chiefly limestone, standing in vertical cliffs along the old cuts.

Cross-over Installation—Height of the new cuts averaged 100 ft., with a maximum of approximately 120 ft. Tracks were moved one track-width west for greater clearance. The heaviest cuts were south of Mile Post 71. Here the operating department, at the suggestion of the construction engineers, installed cross-overs between the two existing main-line tracks to provide a run-around for northbound trains in case the inside track should be blocked. The switching system was protected by double reverse automatic block signals, and temporary interlocking towers were placed at the cross-overs. Towermen operating at these points had authority to switch trains on direct orders from the dispatchers, thus speeding up traffic.

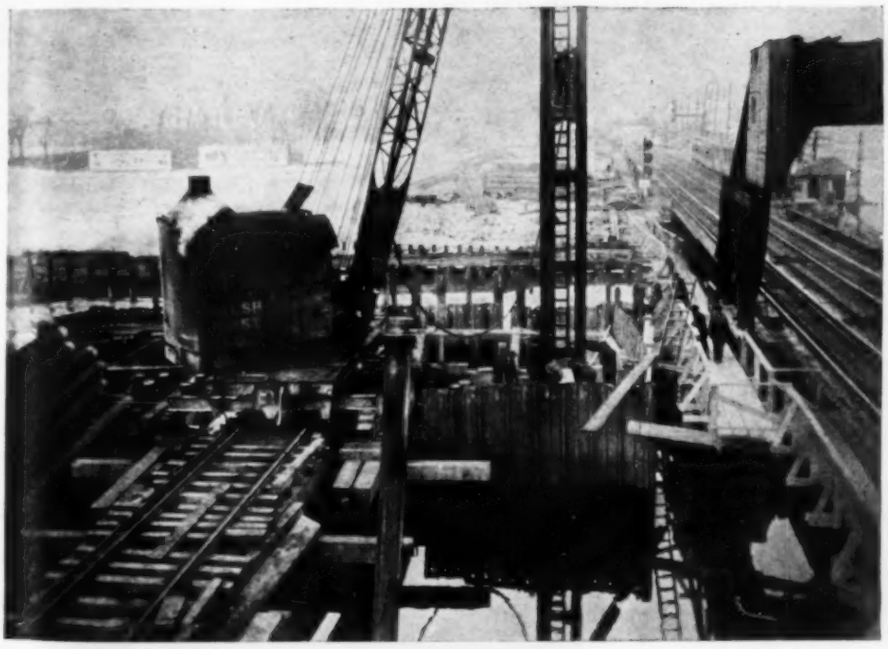
GASOLINE DINKEY (*above*) handles railroad company car being loaded for haul to extend fills north of Walsh Construction Co.'s section. MUD (*left*) at abutment footing is cleaned out by workmen, who cast it into clamshell bucket for dumping outside cofferdam.

Blasting Operations—Twice during the day there is a lull in train movements which allows safe blasting. At eight in the morning, ½ hour is available for shooting the bottom of the rock cuts, and at noon 1 hour is open for shooting the top. One of the eight Browning cranes on the job is always at hand to remove heavy pieces of rock which may fall on the track.

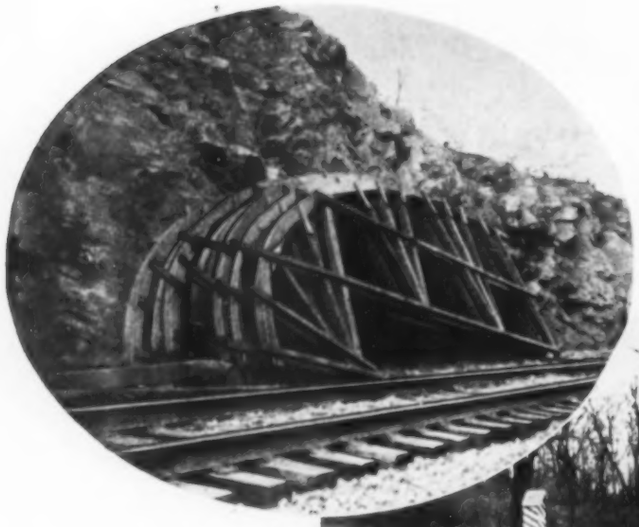
The Walsh Construction Co. is using eight Ingersoll - Rand single - acting 17x19-in. oil-engine compressors, having a capacity of 600 cu.ft. a minute. Two compressors usually are housed at each cut to supply air to the drills. Cuts are excavated to subgrade as the work advances. A total of 24 Ingersoll-Rand N-70 tripod drifter drills distributed over the job puts down 20-ft. holes for the top lift of the cuts, and drilling for the remaining lifts is completed with the tripod drills or with N-72 sinkers, of which the contractor has 36 in use. All drills use 1¼-in. round hollow steel. Holes are drilled closely enough to allow the use of fairly light charges, in order to reduce the scattering of rock.

Five Bucyrus-Erie crawler-mounted steam shovels, of 1½ to 4-yd. capacity, load the rock into Western 12-yd. standard-gage dump cars. Nine 40-ton steam locomotives handle the 90 12-yd. cars, with the assistance of eight Plymouth 8-ton gasoline dinkies distributed where needed.

Empty cars are loaded on dead-end tracks behind the shovels, no loading or hauling being done on the main-line tracks. Where space permits, two construction tracks are laid behind the shovel to save switching.



BASCULE SPAN ABUTMENT will rest on timber piles driven inside steel sheet pile cofferdam and cut off after coffer is unwatered.



WOOD CENTERS for solid intrados of concrete arch are fabricated in halves.

SINKER DRILLS (*right*) start new cut for realignment made necessary by subsidence of river-bank fill.

All bridge abutments rest on wood piles. The Walsh Construction Co. is driving about 2,000 timber piles from 50 to 80 ft. long. Cofferdams of Lackawanna steel sheet piling are constructed in sections, to reduce pumping, and the piles are cut off in the dry. Nine National steam hammers of various sizes from the smallest to the largest drive all the piles and pull the sheet piling. Morrison, Barnes, and Jaeger centrifugal pumps, with 6-in. to 10-in. discharges, keep the cofferdams dry.

A heavy four-track through cut was made at New Hamburg to eliminate an old two-track tunnel. The original intention had been to drive a second two-track tunnel at this point; but shattered rock encountered at the portals forced a change in plans in favor of the cut. Existing grade crossings at New Hamburg are to be abandoned; an overhead concrete arch bridge and a steel girder bridge will replace them.

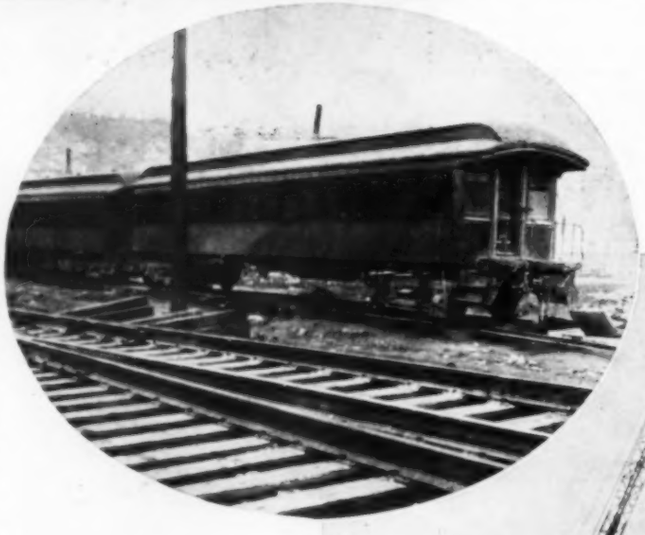
Supervision—F. B. Freeman, chief engineer, and J. W. Pfau, assistant chief engineer, are directing operations for the New York Central Railroad Co. The work comes under the immediate supervision of A. D. Duffie, district engineer, Albany, and T. P. Lynch is resident engineer in direct charge of construction. For the Walsh Construction Co., contractor on all excavation, bridge, and track work, H. C. Kahl, vice-president, is in charge.

Safety Measures—A safety precaution of merit is the railroad company's plan of placing a conductor and two flagmen at each cut to warn the excavating crew of the approach of trains. The conductor operates a whistle as the warning signal. He is commissioned to stop or slow trains if necessary.

All work practically ceases prior to the passing of trains. No activity is permitted which might cause accident or delay to a unit of the railroad's service. All trains operate through the portion under construction on a slow order which delays them very little.

Reduction in number and degree of curves is being effected at many points on the section. At Stoneco, for example, the railroad company exchanged 1½ miles of right-of-way, including a reverse curve, along the river bank, for a straight cut-off through a stone quarry.

Bridges—The contractor is changing or extending ten bridges over small streams or bays. At most of these locations, existing structures are being replaced by four-track deck-girder bridges. The largest of the new bridges is a two-track 85-ft. bascule span which supplements a similar structure across Wappinger Bay, at New Hamburg.

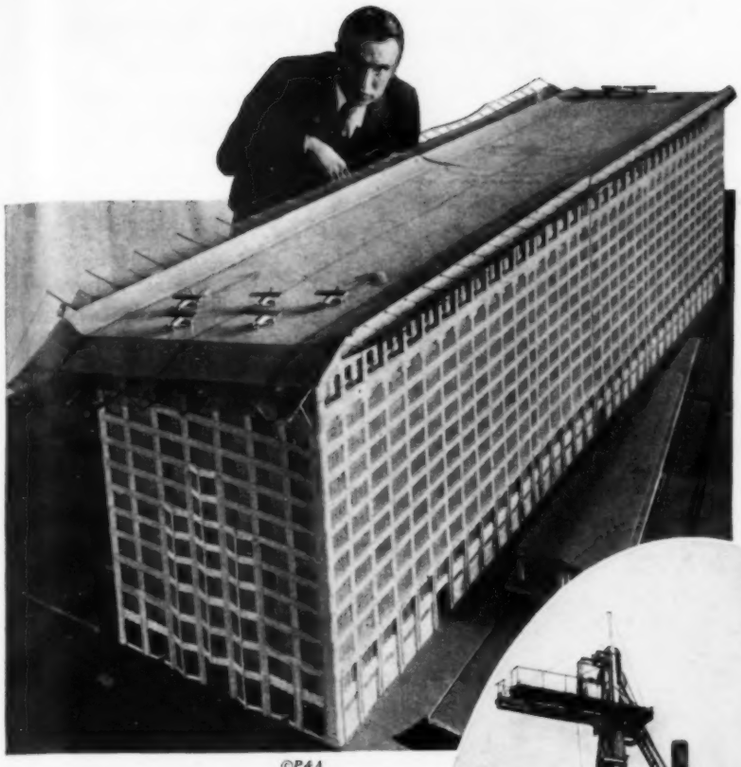


CONTRACTOR'S CAMP CARS (*left*). Five camps of eleven cars each are operated for benefit of laborers.

FALSEWORK bent for overhead concrete arch is placed in four-track cut at New Hamburg.

JOB ODDITIES

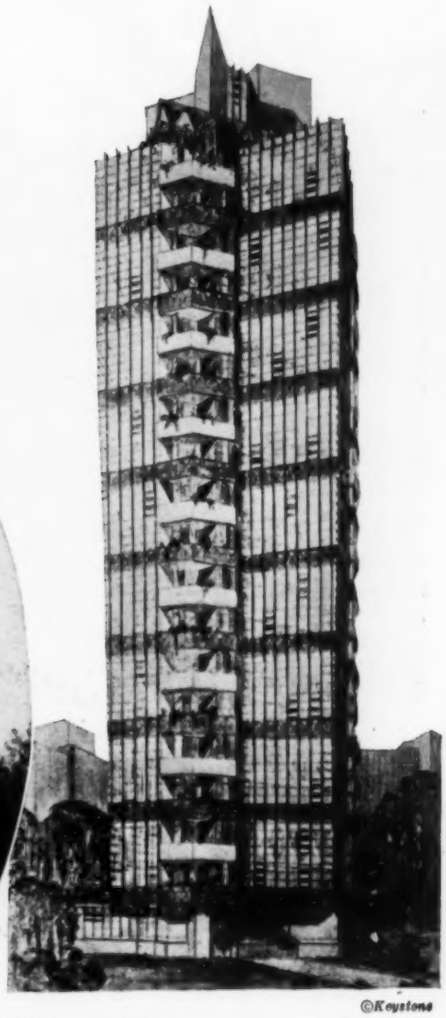
A Monthly Page of Unusual Features of Construction



©P&A

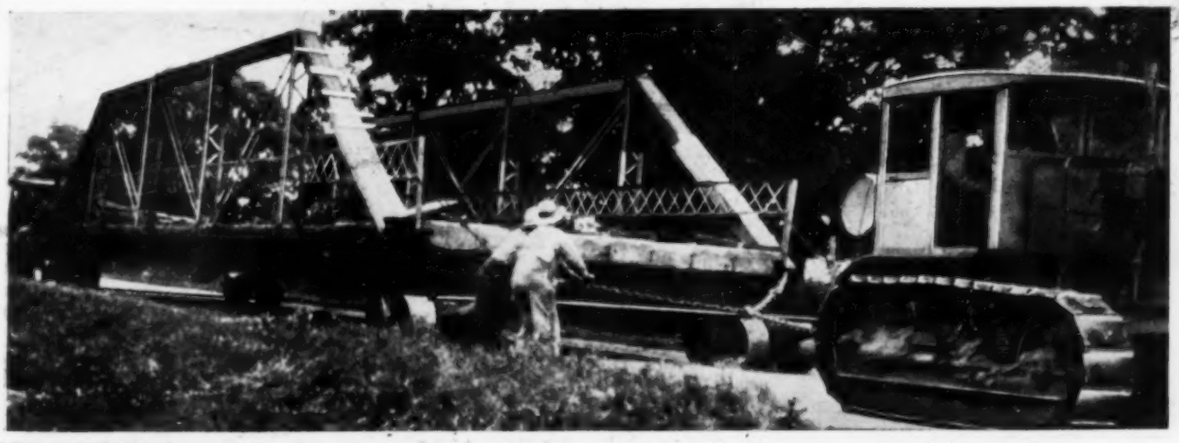
FIRST SKYSCRAPER AIRPORT in the United States will top a $10,500,000 12-story office building now under construction in Los Angeles. O. R. Angelillo, chief engineer of the project, is seen here with the model of the proposed air terminal.

AN OLD TIMER (*right*). Dismantled skeleton of the first tower cableway, a Lidgerwood machine, erected about 1913 to build Mississippi River levees. It has been abandoned along the levee near Rosedale, Miss.



©Keystone

A HOUSE OF GLASS will be provided by this 18-story apartment building which will have heavy, plate-glass walls, concrete floors and balconies of copper. It was designed by Frank Lloyd Wright, architect, and is proposed for erection in New York City.



MOVING DAY. Service in a new location was ordered for this 40-ton pony truss bridge, with a concrete floor, recently replaced by a viaduct over Linn Creek at Marshalltown, Iowa. A Caterpillar tractor hauled it to its future site about a mile and a quarter away.

CRAWLER-MOUNTED CRANES unloaded and distributed steel from cars and handled erection work.

CRANES ERECT STEEL

for 13-Acre Industrial Building

By LEROY JOHNSON
Superintendent,
Illinois Steel Bridge Co.,
Jacksonville, Ill.

COVERING an area of 13 acres along the Illinois River at Peoria, Ill., the new harvester manufacturing building of the Caterpillar Tractor Co. is a steel frame structure of columns and trusses, 1,200 ft. long and 476 ft. wide, involving about 2,500 tons of structural steel fabricated and erected by the Illinois Steel Bridge Co., of Jacksonville, Ill.

After the low, marshy land at the site had been filled with sand and silt pumped in from the river by a hydraulic dredge, two standard-gage railroad tracks, 200 ft. apart, were laid the full length of the building to handle material. Each track is about 135 ft. from the sides of the structure which consists of nine bays; the two outer bays are each 60 ft. wide and the seven intermediate bays each 50 ft. wide. Columns are spaced longitudinally on 36-ft. centers, with stiffening trusses between the columns and the roof trusses.

Steel is unloaded from cars and distributed by two Moore Speedcranes mounted on crawlers. Two other crawler cranes handle the steel erection, under the direction of W. H. Imboden, general superintendent. The general contractor is Fred Harbers Sons, of Peoria. The Austin Co., Chicago, served as engineer for the project.

TO DISTRIBUTE MATERIAL over 13-acre site the contractor laid two standard-gage railroad tracks the full length of the building.

TRENCH HOES

Excavate and Lay Pipe for

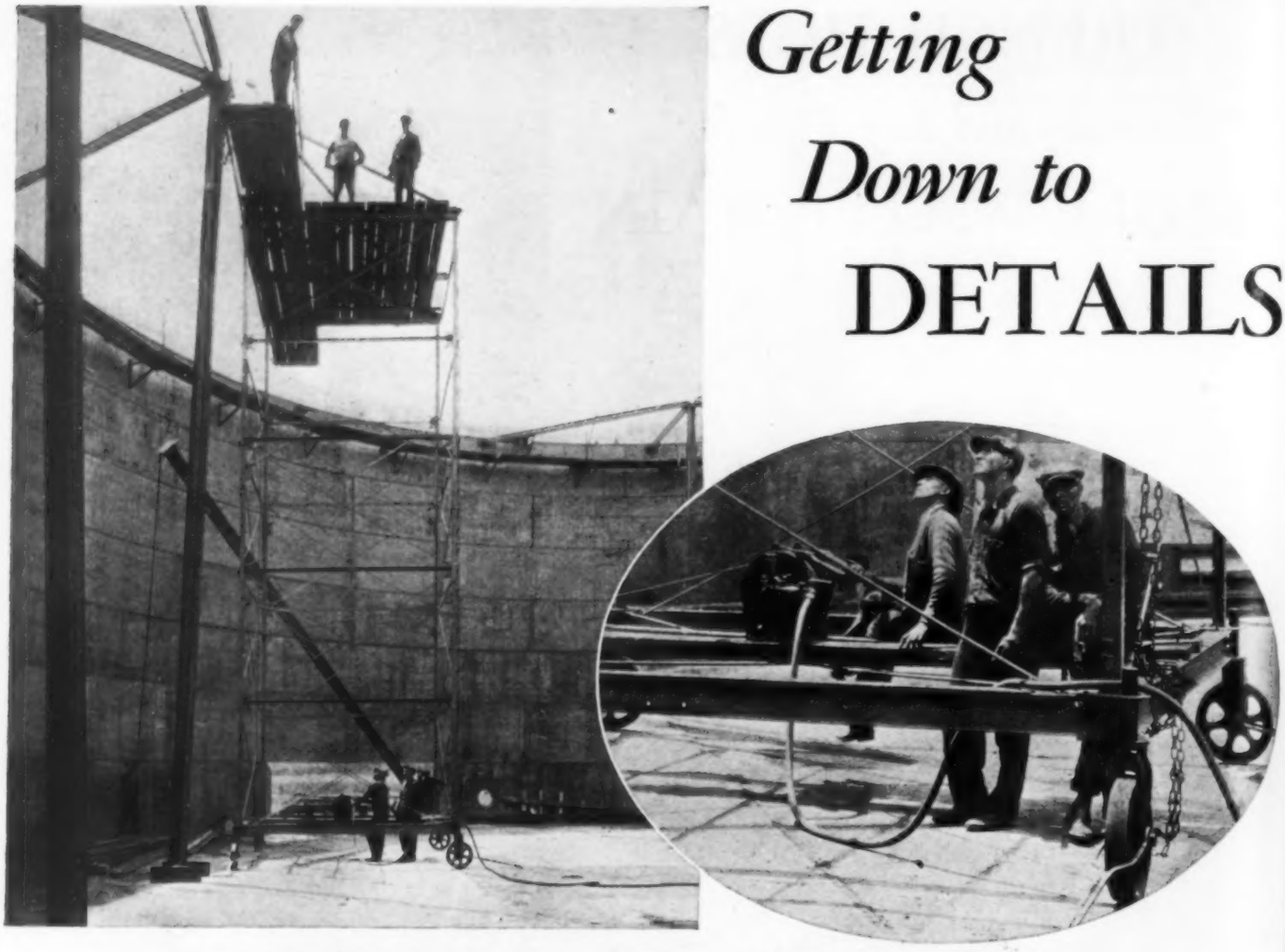
20-MILE WATER MAIN

A 2½-YD. TRENCH HOE belonging to Pepper Bros., contractors, of Syracuse and Albany, N. Y., dug trench enough for 27 12-ft. sections of 48-in. cast iron pipe and laid the pipe in a 12-hour day on a 20-mile water main job for the City of Albany. The pipe sections weigh 6 to 7½ tons each.

The pipe line, which cost $2,250,000, will increase Albany's water supply and lies almost true to the natural run of the hills, up and down steep grades, giving it a gravity flow.

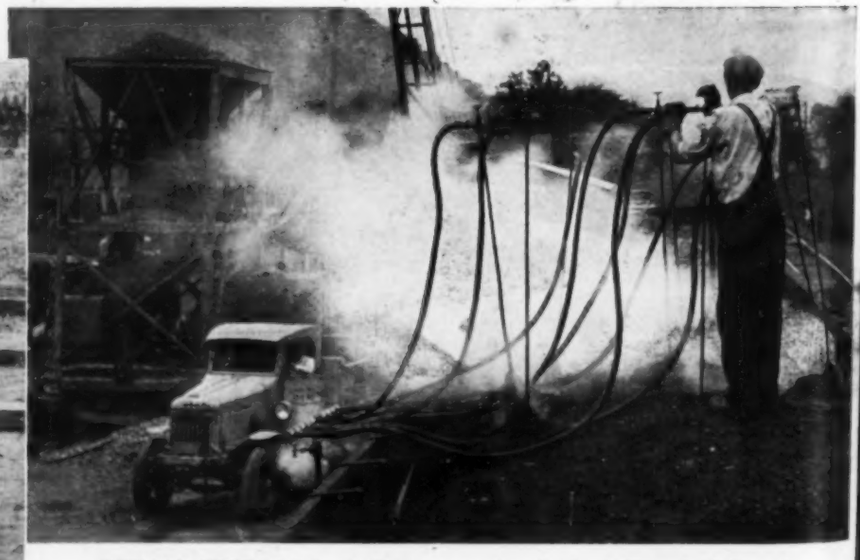
Link-Belt trench hoes are handling the entire job of excavating and pipe laying, a hook bolted to the back of the bucket permitting quick handling of the pipe sling. The trench is 11 ft. wide at the top, 7 ft. wide at the bottom and 7 to 9 ft. in depth.

Getting Down to DETAILS



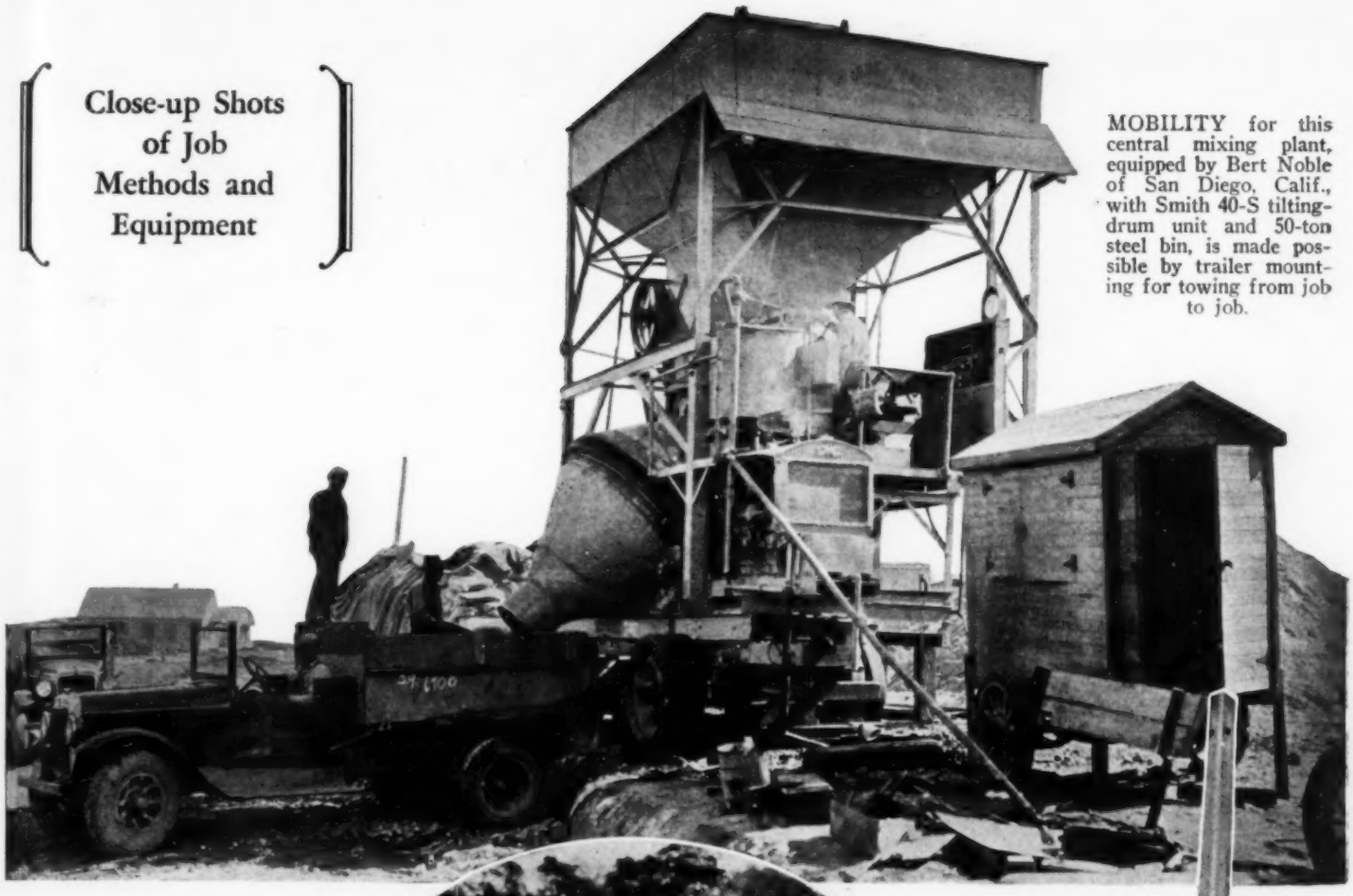
ROOFING BUGGY (*above*) equipped with Sullivan portable air hoist *(in oval)* simplifies construction of 80,000-bbl. oil tank at Olean, N. Y., by Chicago Bridge & Iron Works. The outfit, with elevated working platform is used in raising and placing roof posts and steel plates.

FOR BENDING SMALL PIPE the Elizabeth (N. J.) Paving Co. uses this rig, comprising I-beam staked to ground and Yale & Towne chain hoist to exert pull on end of pipe length.

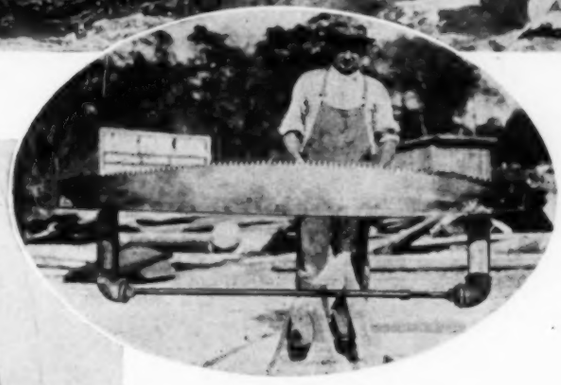


STEAM JETS, fed by boiler, warm a carload of Kyrock delivered during cold weather for highway surfacing in West Virginia. The warming process, developed by the Kentucky Rock Asphalt Co., facilitates unloading and spreading operations and extends the weather limit for construction with the material.

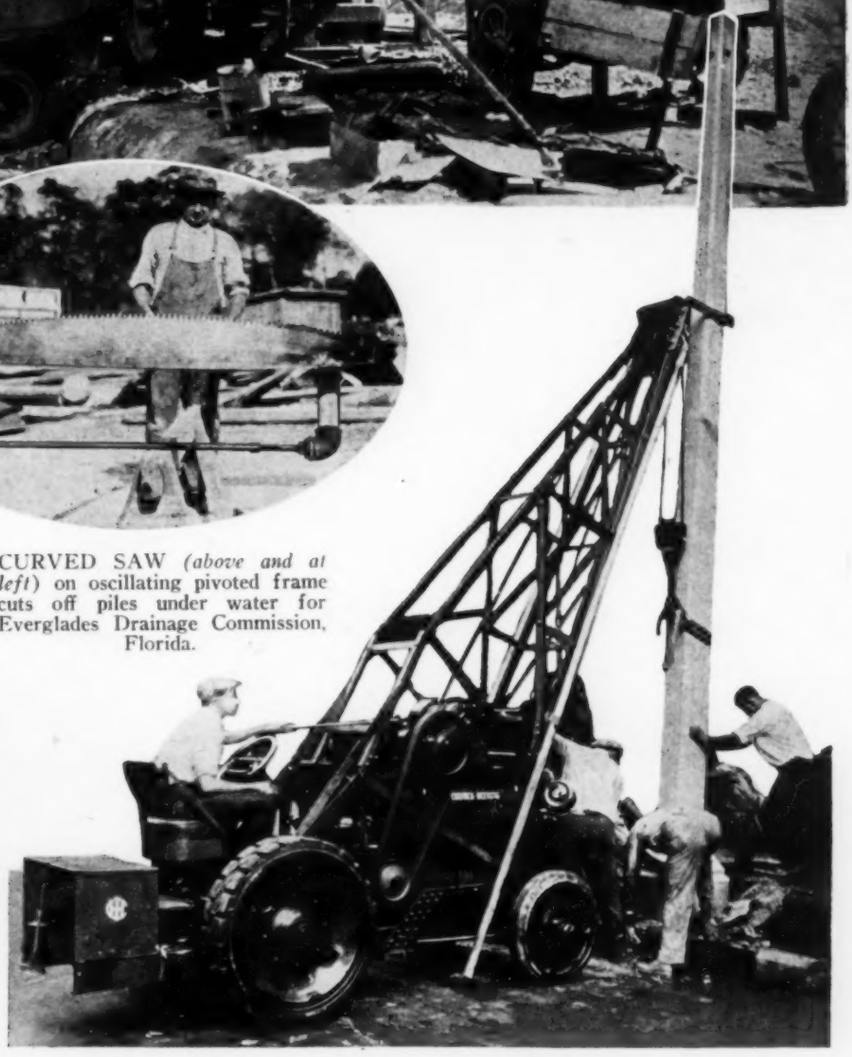
Close-up Shots of Job Methods and Equipment



MOBILITY for this central mixing plant, equipped by Bert Noble of San Diego, Calif., with Smith 40-S tilting-drum unit and 50-ton steel bin, is made possible by trailer mounting for towing from job to job.



CURVED SAW *(above and at left)* on oscillating pivoted frame cuts off piles under water for Everglades Drainage Commission, Florida.



FOR SETTING CONCRETE POLES to carry lights for a "white way" in St. Louis, Mo., the O. B. Avery Co. applied the crane rig illustrated to a McCormick-Deering tractor. The operation of placing a pole with this equipment took from 3½ to 5 min.

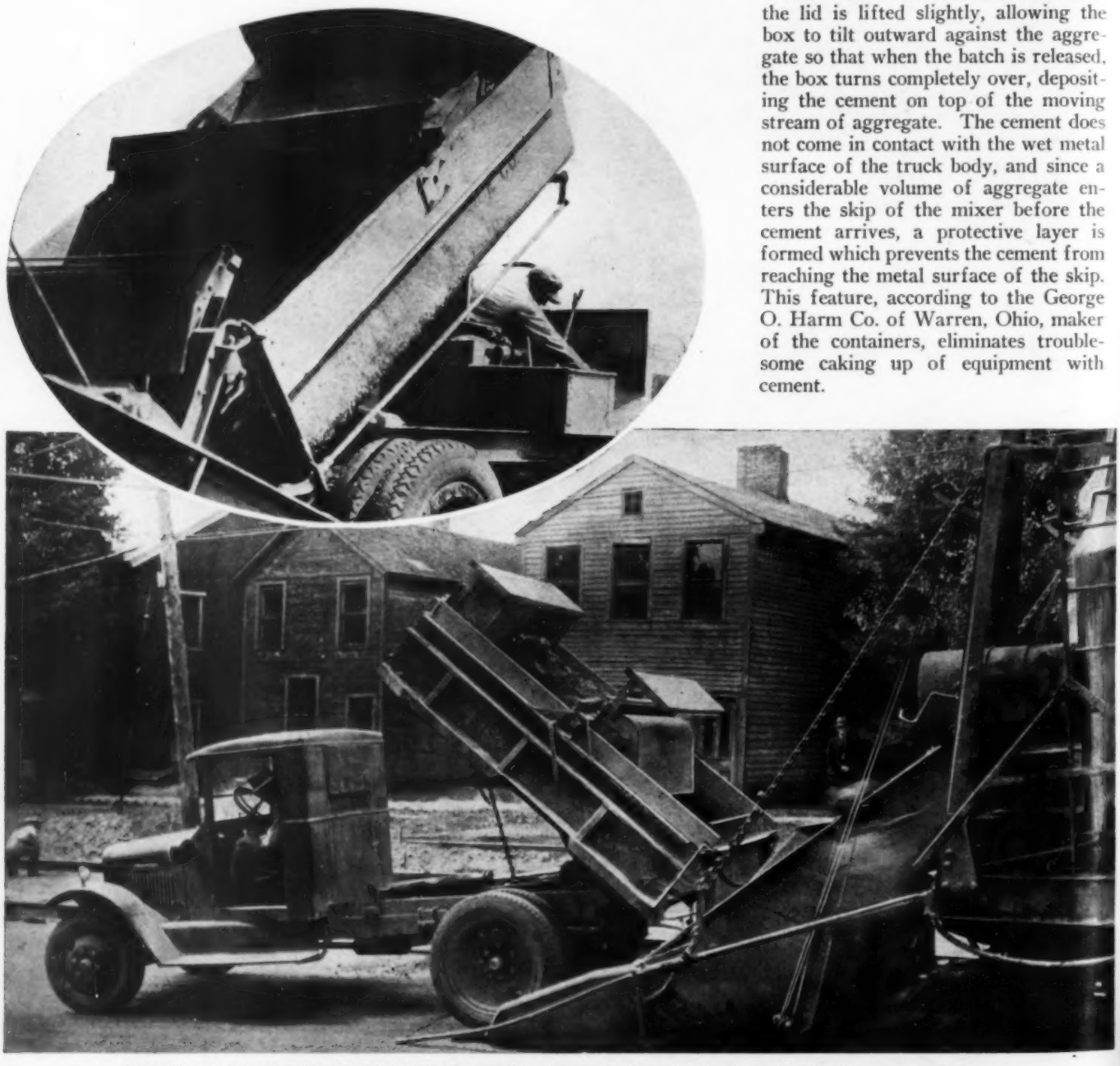
CEMENT CONTAINER *for Batch Trucks*

IN ORDER to cut labor costs and incidental losses in handling sack cement and to make possible the use of bulk cement in those states where the specifications require that cement be kept separate from the aggregate until just before it enters the mixer, a "turnover" cement container has been developed to be used with batch trucks. This piece of equipment was used on numerous road and street jobs in Pennsylvania, Ohio and Michigan last season.

The container is a simply constructed metal box of 8-cu.ft. capacity which will fit in almost any style of truck, so that if a contractor rents a number of trucks for a job, he can use his box equipment on the various types available. The boxes, also, can be quickly removed if the trucks are needed for other work.

Cement is dumped into the containers at the batching plant either from sacks or from a bulk cement handling plant after the aggregate has been loaded. When the lid of the box is closed, it holds the box in an upright position and gives complete protection to the cement while in transit.

When the truck arrives at the mixer the lid is lifted slightly, allowing the box to tilt outward against the aggregate so that when the batch is released, the box turns completely over, depositing the cement on top of the moving stream of aggregate. The cement does not come in contact with the wet metal surface of the truck body, and since a considerable volume of aggregate enters the skip of the mixer before the cement arrives, a protective layer is formed which prevents the cement from reaching the metal surface of the skip. This feature, according to the George O. Harm Co. of Warren, Ohio, maker of the containers, eliminates troublesome caking up of equipment with cement.



CEMENT BOX TURNS COMPLETELY OVER when truck body is raised and deposits its contents on stream of aggregates moving into mixer skip. Until lid is raised box cannot dump.

PERMANENT EXHIBIT BUILDING is 800 ft. long and 140 ft. wide. The walls are 6 in. thick and approximately 30 ft. high with the exception of motives at center and ends which are 50 ft. high.

To Distribute

Small Amount of Concrete Over Large Area

By M. W. LIPPMAN

Hunter & Lippman, Inc., Los Angeles, Calif.

MIXER WITH PAVER SKIP, mounted with hoist and tower on truck trailer handles 75 to 100 yd. of concrete daily in wall 300 ft. long.

A DISTRIBUTION plant that can handle a comparatively small amount of concrete over a large area was rigged up and used with success by Hunter & Lippman, Inc., contractors and engineers of Los Angeles, in the construction of the Permanent Exhibit Building at Pomona, Cal., designed by Karl W. Muck, county architect, for the County of Los Angeles.

The plant used in placing the concrete is an adaptation of a 2-sack Jaeger mixer and paver skip mounted with a hoist and tower on a truck trailer. The hoist controls were extended in such a way that one man could operate the entire plant. Power for moving was furnished by the hoist by means of a line reeved from a deadman through a block held under the trailer and then to the niggerhead. With this outfit, under the supervision of James Carter, general superintendent, 75 to 100 yd. of concrete was handled daily in a wall 300 ft. long.

The building is 800 ft. long and 140 ft. wide. The roof is supported by a three-hinged steel arch. The walls are 6-in. thick and from 30 to 50 ft. high.

Present and Accounted For —

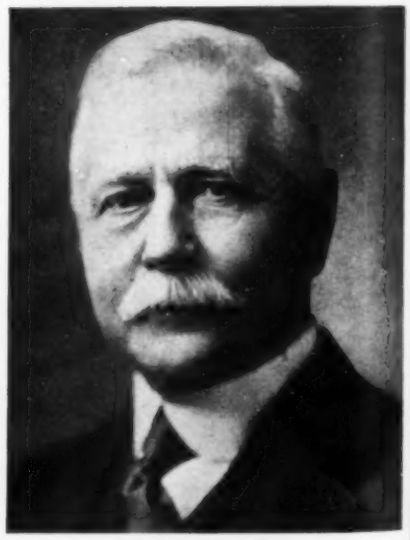
A Page of Personalities

A. R. LOSH, former district engineer for the U. S. Bureau of Public Roads with headquarters at Ft. Worth, Tex., has recently been appointed state highway engineer of Oklahoma.

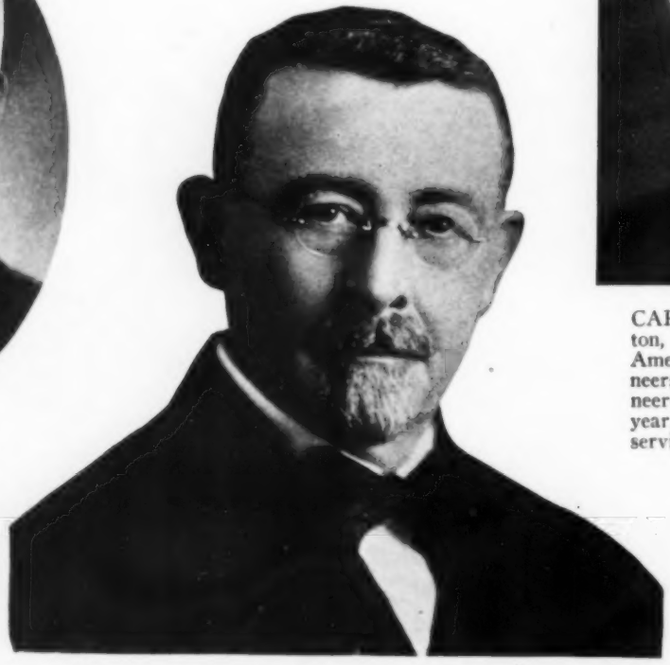
R. H. KEAYS, chief engineer for Ulen & Co., was awarded the James Laurie prize for his paper, "Construction Methods on the Moffat Tunnel," by the American Society of Civil Engineers at its annual meeting.

H. D. PALMORE, the new state highway engineer of Kentucky, has served the department in various capacities for the last twelve years, during several months of which he was acting state highway engineer. His appointment followed the resignation of J. S. Watkins.

HAROLD CROWELL, vice-president of the Weymouth Crowell Co., has been elected president of the Southern California Chapter of the Associated General Contractors for 1930.



CARL E. GRUNSKY, of Stockton, Calif., past-president of the American Society of Civil Engineers, heads the American Engineering Council for the current year. A wide program of social service is planned by the society under his direction.



JOHN F. COLEMAN, consulting engineer of New Orleans, La., is the new president of the American Society of Civil Engineers, having been elected at the annual meeting of the society in New York City in January.

NEW EQUIPMENT ON THE JOB

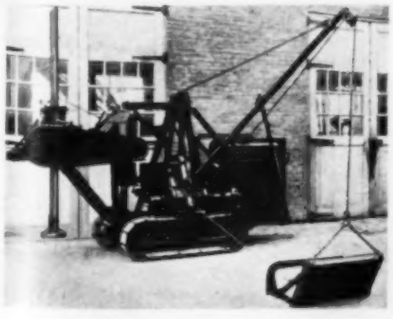
Reduces Idle Truck Losses

Losses due to idle trucks in bad weather may be greatly reduced and high speed on paved roads attained by the use of Trucktors, according to the

Trucktor Corporation, of Newark, N. J. This equipment consists of an extra pair of wheels placed under the frame of the truck to which are attached in muddy weather 24-in. alloy steel tracks of open, self-cleaning design. These tracks enable trucks to make headway over soft ground with their usual load. Separate coil springs on the extra wheels provide automatic track tension and take-up. The extra wheels also enable trucks to carry a double pay load which the law allows in most states.

Machine Backfills and Tamps

To meet the demand for a machine that would both backfill and tamp, the Cleveland Trencher Co., of Cleveland, is offering a tamper-backfiller which eliminates hand labor for these two operations. The machine is but 58-in. in extreme width which makes it useful in close quarters. It is mounted on full crawler tracks. The



tamping mechanism, which will work either at the center or side of the machine, consists of a 150-lb. steel tamping head which can be dropped 45 times per minute from a 26-in height. Backfilling and tamping speeds are 3½, 7 and 11½ ft. per minute and the unit has a road speed of 5 miles per hour. The backfiller is equipped with a telescopic boom, the length of which can be varied from 14 ft. 2 in. to 20 ft. 2 in. It is powered by a 4-cylinder Hercules gasoline motor.

Table Saw for Contractors

Contractors are finding many and varied uses for a table saw that will serve equally well on large and small

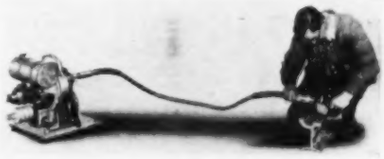
jobs. To meet this need the Crowe Manufacturing Corporation, of Cincinnati, has placed on the market a portable gasoline or electrically-driven machine. It has a ripping gage 16-in. long, adjustable to any width up to 12 in. Its saw blade is 12 in. in diameter. It cuts and bevel cuts boards 4 in. thick. It weighs 350 lb.

Cement Companies Combine

The Universal Atlas Cement Co., a subsidiary of the United States Steel Corporation, has taken over the business of the Atlas Portland Cement Co. and the Universal Portland Cement Co. The combined productive capacity and sales territory of these companies, it is announced, will make cement more easily available to an increased number of users of the product and thus improve the service to customers.

Portable Power Unit

A portable power unit for operating drills, grinding and polishing wheels, circular saws, pumps, compressors, etc., is being marketed by the Home-



lite Corporation, of Port Chester, N. Y. It is equipped with a built-in 1½-hp. air-cooled gasoline engine and two shafts, 1,800 and 450 r.p.m. Its weight is less than 100 lb.

For Fast Delivery Service

Mack Trucks, Inc., New York City, has a new 1½-ton truck added to its line, the purpose of which is to supply the demand for a fast delivery

machine. It can be obtained with three standard wheelbase lengths, 138, 158 and 168 in., and four standard body types, designed especially for the new model. It is powered by a 6-cylinder engine which develops 75 hp. at 2,600 r.p.m.

New Line of Dump Wagons

A new line of crawler-type—known as "Cat-tread"—wagons for use on all

kinds of earth-moving operations where loading is done with power shovels or elevating graders is being introduced by the Davenport Locomotive & Manufacturing Corporation, of

Davenport, Iowa. They are made in two sizes, 5 and 7-cu.yd. capacity, the former weighing 8,400 lb. and the latter 10,500 lb. At the present time they are provided only with bottom dump, but a later model will be equipped with a three-way dump body.

Bulldozer for Tractor

A combination bulldozer and straight blade snow plow for attachment to the model 20 Cletrac tractor is a late product of the Acme Road Machinery

Co., of Frankfort, N. Y. The blade is arranged so that it can be adjusted for cutting or dragging or for casting material either to the right or left of the machine.

For Leveling Concrete Slabs

Leveling concrete slabs on a building job by setting up wood screed strips is slow and tedious work and involves expensive lumber and labor costs. The new adjustable screed gages of the M & M Wire Clamp Co., of Minneapolis, are designed to reduce the cost of this operation for the contractor.

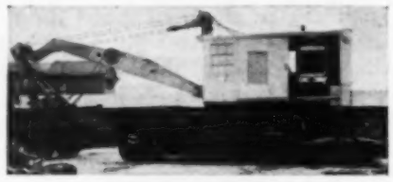
The gage is 16 in. high providing

an adjustment for slabs from 2 to 16 in. in thickness. It is driven into the form decking where a starting hole is bored with a carpenter's brace and a $\frac{5}{16}$-in. bit. The casting with a cut nail wedge is then adjusted to proper height with a hammer.

Gages can be used over and over again and can be pulled out by hand if the slab is not too deep.

Carries Heavier Pay Loads

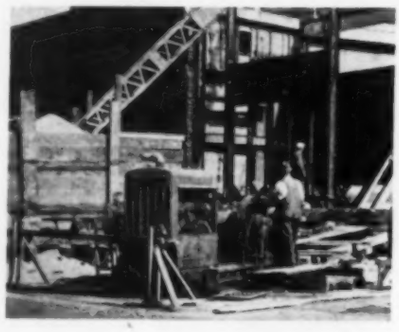
The ability to carry heavier pay loads when necessary without making any increase in the dead load is the unusual feature of the new arch-



girder heavy-duty trailer developed by the G. H. Williams Co., of Erie, Pa. The trailer's increased strength is due to the unique mounting of the rear wheels, each of which turns on a short, individual axle supported at both ends without any overhang.

Gasoline Hoist for Large Jobs

For large jobs on which electric power is not available the Thomas Elevator Co., of Chicago, has designed



a 100-hp. hoist operated by gasoline instead of steam. The accompanying photograph shows one of these hoists in use on the addition to the Union Station Power House in Chicago.

Improved Heavy-Duty Shovel

Improvements on the turntable and on the crawler mounting are features

of the new Lorain 75-B shovel recently placed on the market by the Thew Shovel Co., of Lorain, Ohio.

Ruggedness of the turntable is increased and power is provided either from a 97-hp. Waukesha gasoline engine or a 7x8½-in. Atlas Imperial Diesel engine. The crawler mounting is 12 per cent longer than previously and 2,300 lb. heavier. It is propelled by the Thew center drive, with newly designed driving pinions, which, with the larger power plants, give a 12-per cent greater tractive effort.

A "Three-in-One" Tool

For excavating, scraping and grading, the Wiard Plow Co., of Batavia, N. Y., is marketing an automatic revolving scraper in two sizes, the 4-ft.

size which carries ½ cu. yd. and the 5-ft. size which carries 1 cu.yd. These capacities may be increased by the use of the extension back which is a special feature of the scraper. Other features are: quick loading, automatic control for excavating, spreading, backing and dumping and one-man operation.

Grader Powered by Tractor

A one-man grader made by the Wehr Co., of Milwaukee, and powered by a United tractor, a product of the Allis-Chalmers Co., also of Milwaukee,

is included in the line of the United Tractor & Equipment Corporation, of Chicago. This machine is a rugged, speedy unit used for grading and maintenance work. The tractor, which is furnished either with rubber tires or crawler traction, has a four-cylinder, heavy-duty engine with a 4¼-in. bore, 5-in. stroke, and speed under full load of 1,200 r.p.m.

Alabama State Highway Dept. (5)
Georgia State Highway Dept. (2)
State of Illinois, Bureau of Maintenance . . . . (2)
Missouri State Highway Dept.

UNIVERSAL

New Mexico State Highway Dept.
New York State Bureau of Canals and New York State Bureau of Highways . . (10)

HOW MANY MACHINES and how much an investment would you have to make to handle these jobs:

Unloading Cars	Building Berms	Placing Culverts
Charging Bins	Driving Piles	Removing Slides
Grading Roads	Building Bridges	Cleaning Up
Widening Streets	Handling Batch Boxes	Loading Trucks
Digging Ditches		Digging Gravel

Just one Universal Truck Crane will do one or all of these jobs easily, moving with the speed of a motor truck from job to job. That's why the highway maintenance departments listed here have found Universal machines to be profitable investments.

THE UNIVERSAL CRANE COMPANY · Lorain, Ohio

North Carolina State Highway Dept.
Ohio State Highway Dept. (11)
Pennsylvania State Highway Dept. (2)

South Carolina State Highway Dept.
Tennessee State Highway Dept. (2)
West Virginia Highway Commission . . . . . (2)

One purchase and a *thousand* savings

Concrete Steel Company has brought order to the field of reinforcing. Today it costs no more to buy Havemeyer Reinforcement than to buy bare materials. And the savings which the new way makes possible will be found on many pages of the time sheets. Havemeyer Reinforcement takes the whole work of co-ordinating reinforcement problems, details and deliveries from the shoulders of your organization and places them with Concrete Steel Company—specialists with a national organization and reputation.

An engineered job—no delays—no extras—one purchase—one responsibility . . . A comprehensive book on Modern Concrete Reinforcement will be sent on request . . . Make our nearest district office your reinforcement department.

HAVEMEYER REINFORCEMENT

Concrete Steel Co.

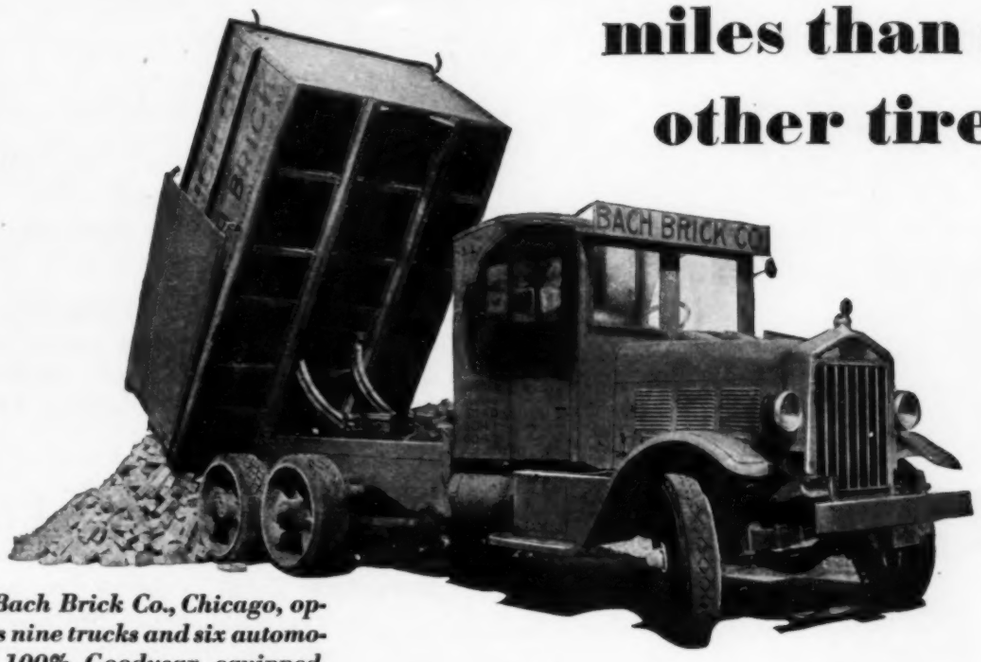
HAVEMEYER REINFORCEMENT

One Purchase
One Responsibility

- ✓ Engineered Plans
- ✓ All reinforcing material
- ✓ Complete cutting and bending
- ✓ All spacing and holding devices
- ✓ Scheduled deliveries floor by floor
- ✓ Field Engineers
- ✓ One billing schedule

EXECUTIVE OFFICES . . 42 Broadway, New York
DISTRICT OFFICES—Birmingham, Boston, Chicago, Detroit, Milwaukee, Minneapolis, Philadelphia, Pittsburgh, St. Paul, Syracuse, Washington

"GOODYEARS give us more miles than any other tires"



The Bach Brick Co., Chicago, operates nine trucks and six automobiles 100% Goodyear equipped.

THE big stress of hauling building materials comes at the delivery point. Here is rough going over curbs, boards and boulders; often soft going, too, in and out of excavations. You know it takes a rugged tire of great traction and cushioning effectiveness to give a good account of itself under such conditions.

Especially significant, therefore, is the following statement of the Bach Co., which operates in Chicago where trucks are barred from the boulevards and must travel great distances on rough side streets: "After trying out almost every prominent make of tire we find Goodyear gives us more miles than any other".

Goodyear Super Heavy Duty Cushions are the tires that are giving the Bach Co. these surplus miles. They have the extra thickness of resilient long-life rubber which protects the truck and driver from road shock. They have the famous All-Weather Treads which give sure traction and long, even, economical wear.

Goodyear makes just the right tire for your other hauling needs. For instance, there are Goodyear All-Weather Tread Pneumatic Truck Tires which combine speed and traction with unusual reliability. And for excavating work no tire can better fulfill the needs than Goodyear Special Dump Truck Pneumatics with their husky flanges of rubber extending far up the side walls for traction and protection.

The Goodyear Truck Tire Service Station Dealer is equipped and trained to recommend the right tire for your needs . . . On your new trucks specify Goodyears.

GOODYEAR

Copyright 1929, by The Goodyear Tire and Rubber Co., Inc.

More Tons Are Hauled on Goodyears Than on Any Other Tires

"Here, Lad—

I've been looking over the architect's plans and 'specs' for the swimming tank in the new building.

He wants us to build it by arc welding.

I'll have to tell him that the best construction is to rivet and caulk. He ought to know it."

TRADITION

"No, Pop—KNOW is his middle name—since he opened the door to welcome my friend here, *'Arc Welding'*.

The architect KNOWS when he designs for welded steel construction and proves it when he specifies that it is to be 'Stable-Arc' welded.

He KNOWS that he will have an absolutely water-tight tank because when 'Stable-Arc' welded it's literally one piece and will never need caulking expense.

Read 'Studies in Structural Arc Welding' plate 7, (you can get a copy by writing Lincoln). It describes a steel swimming tank in the new Y. M. C. A. Building, Detroit.

I made this note from it of men who KNOW. 'Albert Kahn, Inc., were the architects and engineers, Patterson Construction Co., General contractors; Muskegon Boiler Works, tank contractors; Titus Welding Co., welding contractors; Lincoln 'Stable-Arc' welders supplied the welding current'.

These people in the KNOW of swimming tank construction put the NO on riveting and caulking."

The Lincoln Electric Co.
Dep't No. 32-3, Cleveland, O.

PROGRESS

The Lincoln "Stable-Arc" Welder

—welds easier
—makes better welds
—permits greater output

because of the steady uniform arc throughout entire welding range, which is the result of:

Variable voltage design
Laminated magnetic circuit
Separately-excited generator field
Double control of welding heat
All steel construction

No other welder has all these features.

LINCOLN "Stable-Arc" WELDER

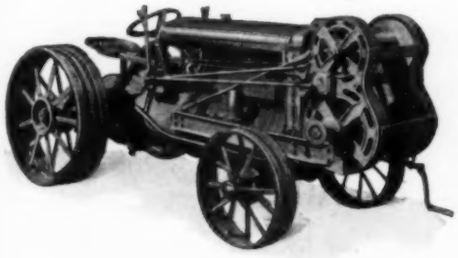
W-131

The United Crawler Tractor is the ideal combination of rugged power, speed and sure-footed traction to meet the varied requirements of contracting, road building and general industrial work. A joint product of Trackson Company and Allis-Chalmers United Scrapers, built by Perry Co., bring new economy to earth moving jobs.

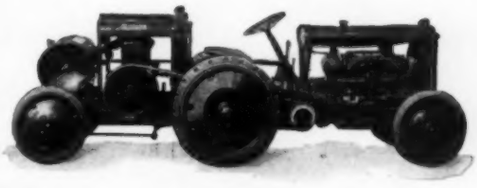
SAVE TIME - MEN - MONEY

On construction and road building work! Cut operating costs and increase your profits with Allis-Chalmers powered United Equipment. Get the facts about United Industrial Tractors and the complete line of United Equipment designed for your particular needs.

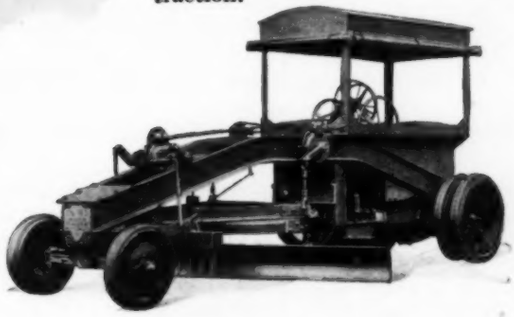
Write for details and name of your nearest United Distributor



United Power Graders, product of Wehr Company, offer all the proven features of Wehr construction plus the added power and economy of the United Tractor. Strong, durable and inexpensive to maintain. Furnished in both Rear and Center Control models with wheel or crawler traction.



The United Industrial Hoist is supplied in both single and double drum types and is especially adapted to material elevator and steel erecting jobs, as well as dragline and slackline work. Highly efficient and adaptable to a wide range of work. Built by Muskogee Iron Works.



The United Air Compressor, built by Schramm, Inc., for use with the United Tractor is a highly mobile and efficient unit. Quickly mounted on tractor and easily removed when tractor is needed for other work. Displacement 162 cubic feet per minute.

UNITED TRACTOR & EQUIPMENT CORP.

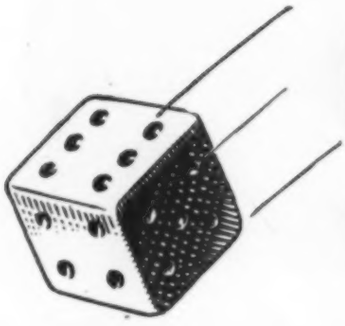
612 NO. MICHIGAN AVE. CHICAGO, ILLINOIS.

UNITED TRACTORS & EQUIPMENT

MANUFACTURING MEMBERS

ALLIS-CHALMERS MFG. CO.
DETROIT HARVESTER CO.
DORSEY BROTHERS
FRENCH & HECHT, INC.
MUSKOGEE IRON WORKS, INC.
NORTHWESTERN MFG. CO.
PERRY COMPANY
SCHRAMM, INC.
THE HUGHES-KEENAN CO.
TRACKSON COMPANY
WEHR COMPANY

YOU CAN'T



LEAVE HAULING TO CHANCE . . .

Successful contractors don't base their estimates on guess. They don't rely on chance patronage. They don't depend on inexperienced workmen. Nor should they select their trucks by hit-or-miss methods.

Owners of Dodge Trucks in the Contracting Industry —there are thousands of them—have taken the chance out of truck selection. They have proved that these workers possess the very qualities valued by seasoned contractors . . . . power for hill or hole —speed for time-saving hauling—dependability to serve unflinchingly—economy as consistent as it is thorough—good looks you will be proud of—comfort and ease of control that make for contented drivers.

Let your Dodge Brothers dealer show you the size and type of Dodge Truck that best fits your needs. Buy it complete with body ready for service—at a price as moderate as its earning ability is high.

DODGE TRUCKS

© 1930
G. C. M., Inc.

How Long *Should a* Culvert Last?

Above — GOHI Corrugated Culvert installed near Cookeville, Tenn., in 1909. Still practically perfect after 20 years of service.

GOHI Corrugated Culverts are made of pure Iron-Copper Alloy, which is definitely known to be the longest-lasting culvert metal on the market today.

Easily handled. Installed between sunup and sundown. No repairs. No upkeep.

AN engineer once remarked — "I use Culvert material that will last 2000 years."

We might well ask — Is there any such material? If there is, who can prove it?

If such material could be found — could it give 2000-year practical service?

It is a commonly known fact that, even in the comparatively short span of 15 years, the forces of erosion make tremendous changes where highways and fills have been constructed, frequently making necessary re-location of drains even in less than that short time.

All evidence points conclusively to a minimum life for GOHI Corrugated Culverts of many years in excess of the drainage demands which necessitated the original installation.

During such a period of service, GOHI Corrugated Culverts, through original low first cost, saving in investment, and freedom from upkeep, effect practical economies that far more than offset the value of any claims for longer service, or the highly improbable need for longer service.

GENUINE OPEN HEARTH IRON
GOHI
TRADE MARK
PURE IRON - COPPER ALLOY
REG. U.S. PAT. OFF.

(Meet copper-bearing pure iron requirements in all accepted specifications for corrugated metal culverts.)

Corrugated Culverts

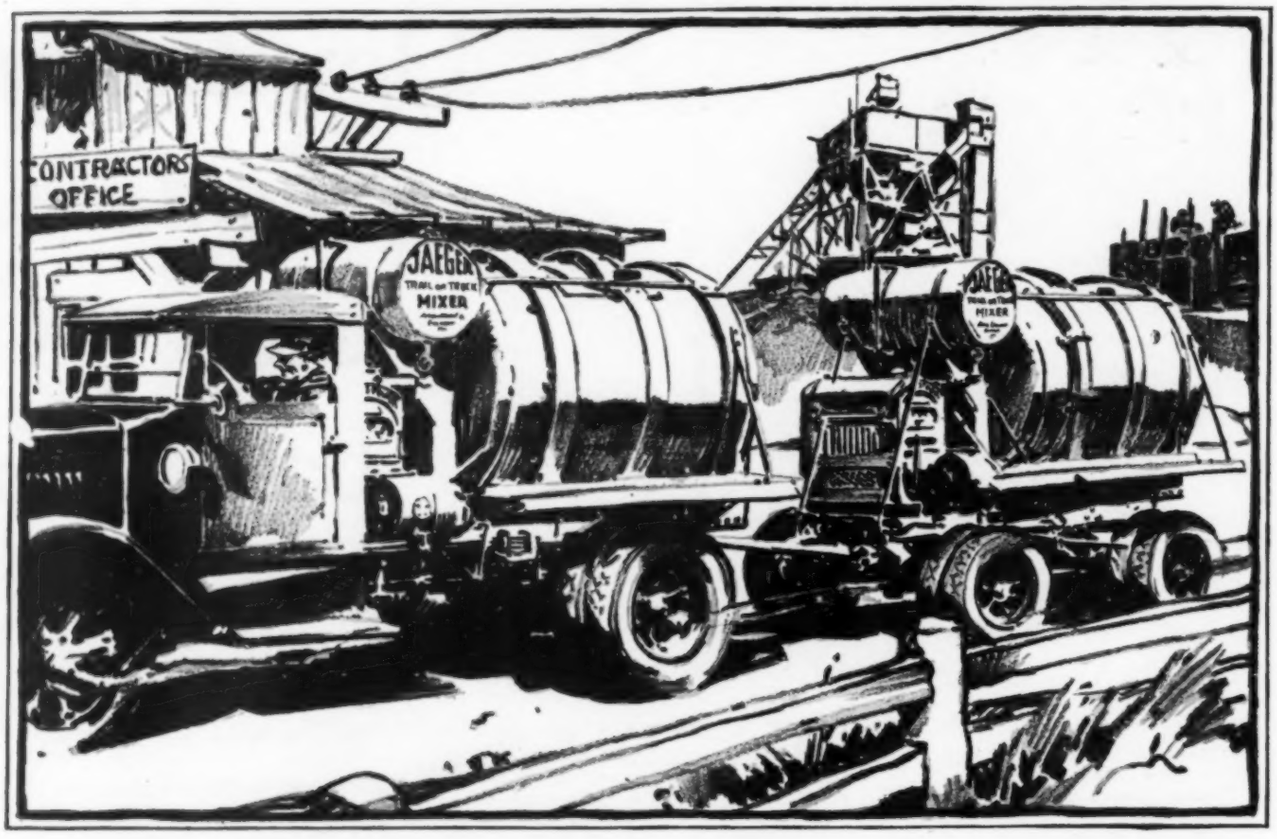
Give Lowest-cost-per-year Service

Specify them for their many practical advantages over the heavier, rigid type. Any of the GOHI Culvert Fabricators listed below can furnish technical service on any culvert installation.

GOHI CULVERT MANUFACTURERS, Inc., Newport, Ky.

Denver Steel & Iron Works Co. Denver, Colo.	**Lincoln Steel and Forge Co.** St. Louis, Mo.	**Roanoke Sales Corp.** Roanoke, Va.	**Tennison Brothers** Texarkana, Ark.
A. N. Eaton, Metal Products Omaha, Nebr.	**The Newport Culvert Co.** Newport, Ky.	**St. Paul Corrugating Co.** St. Paul, Minn.	**Capital City Culvert Co.** Madison, Wis.
Feenaughty Machinery Co. Portland, Oregon	**The Pennsylvania Culvert Co.** Philadelphia, Pa.	**Tennison Brothers** Oklahoma City, Okla.	**Central Culvert Co.** Ottumwa, Iowa

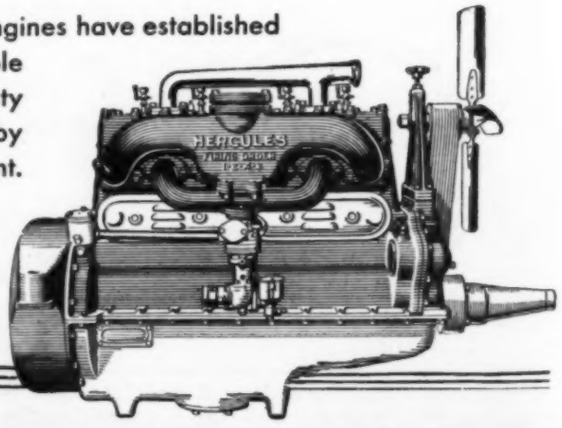
Concrete Mixed in Transit



by Hercules Engines

Mixing 5 yards of material enroute from the batcher to the job, Hercules-Powered Jaeger Trail or Truck Mixers enable contractors to rush concrete construction work and cut down expenses. On short hauls —even with a dry mix—the reliable Hercules Engines respond unfailingly with the added punch and power needed to speed up the drums and insure thoroughly mixed batches.

On all types of industrial machinery, Hercules Engines have established a reputation for reliability and economy. Simple and rugged—expressly designed for heavy-duty service—they are used as standard power by leading manufacturers of industrial equipment.



HERCULES MOTORS CORPORATION
Canton, Ohio, U. S. A.

West Coast Branch: Los Angeles, Calif.
Mid-Continent Branch: Tulsa, Okla.

HERCULES ENGINES

POWER

6 CYLINDERS
35% RESERVE

FLEXIBILITY

3 SPEEDS EACH DIRECTION

MOBILITY

50 BALL & ROLLER BEARINGS

RUGGEDNESS

ALL STEEL CONSTRUCTION
EVEN TO THE WHEELS

HERCULES *the* Roller — *different* because it corrects the weaknesses found in most other rollers. Built for long tough service over a design that has the approval of the Contracting Fraternity, Highway Officials, and other Public Officers. Every gear, the clutches and all the shafts are enclosed in a dust-proof, weather-proof cast-steel housing and run in a bath of oil. The front wheel suspension is the 'gyroscopic' type—no tilting, no 'cutting', or 'ridging', no 'skidding'—easier steered and shorter turning radius than any other roller. Handles as easily as a well balanced motor car. Has plenty of reserve power for the hills and 'soft' spots. Built by Osgood, who have been building quality Contractors' equipment for more than fifty years. The greatest single advance in this field since the advent of the revolving power shovel. Sold by sixty of the leading Contractors' Equipment Distributors. You'll see it on all the big jobs this year.

THE HERCULES COMPANY • MARION, OHIO

$170.00

LIST AT MILWAUKEE

Something New in 3" Diaphragm

Here's a brand-new 3-inch diaphragm on a brand-new idea—for all-purpose dewatering—up to 6500 G. P. H.

It gives the contractor the most diaphragm pump in the smallest, lightest package.

Overall the Water-Boy measures only 30 inches high—29 inches wide—42 inches long.

And tips the scales at 525 pounds, fighting weight—250 pounds lighter than any comparable job.

But that's not all—for efficiency and sweet design are added to compactness.

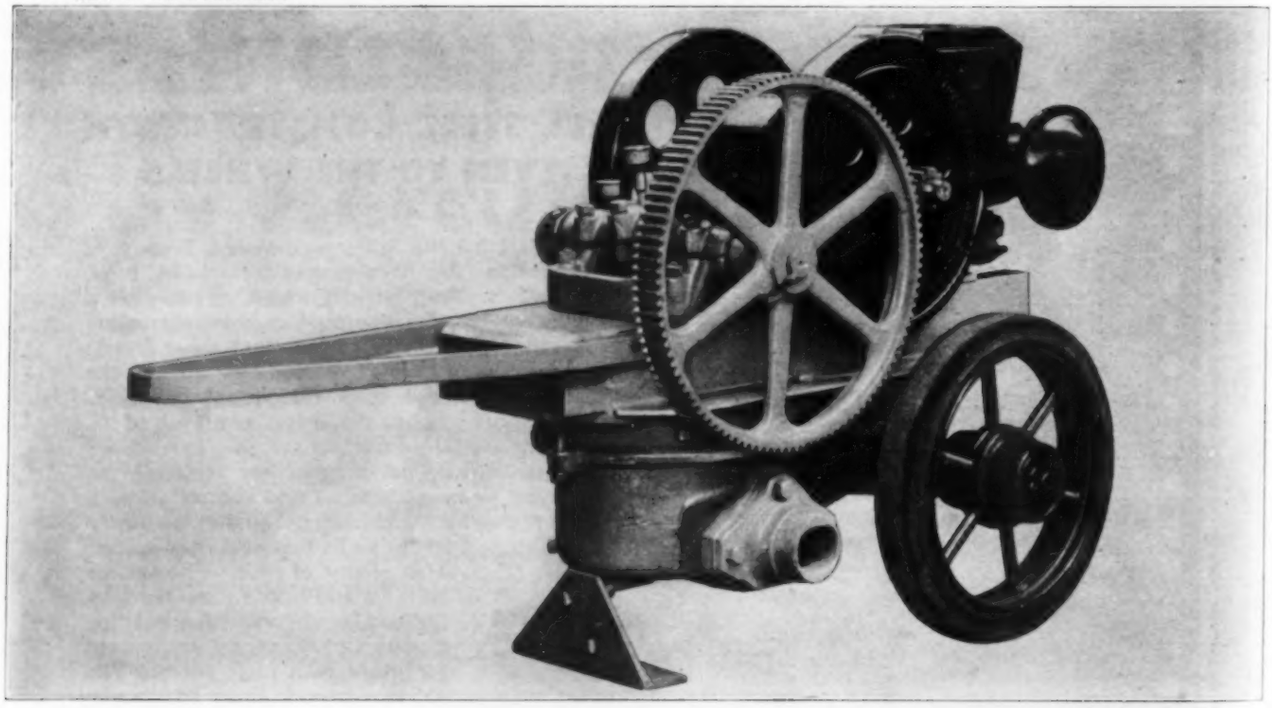
The engine is completely enclosed in a dust-proof case—and it is self-oiling.

The diaphragm can be changed in 9 minutes, without back-breaking or finger-smashing. Simply tilt back the counterbalanced frame—and the diaphragm is perfectly exposed for easy change.

And at the price of $170 list, there's nothing in the field to touch this REX.

These Two and 16

REX 3" DIAPHRAGM



CHAIN BELT COMPANY, 764 Park St., Milwaukee, Wis. Cable Address: Beltchain

Send me catalogs which I have checked:

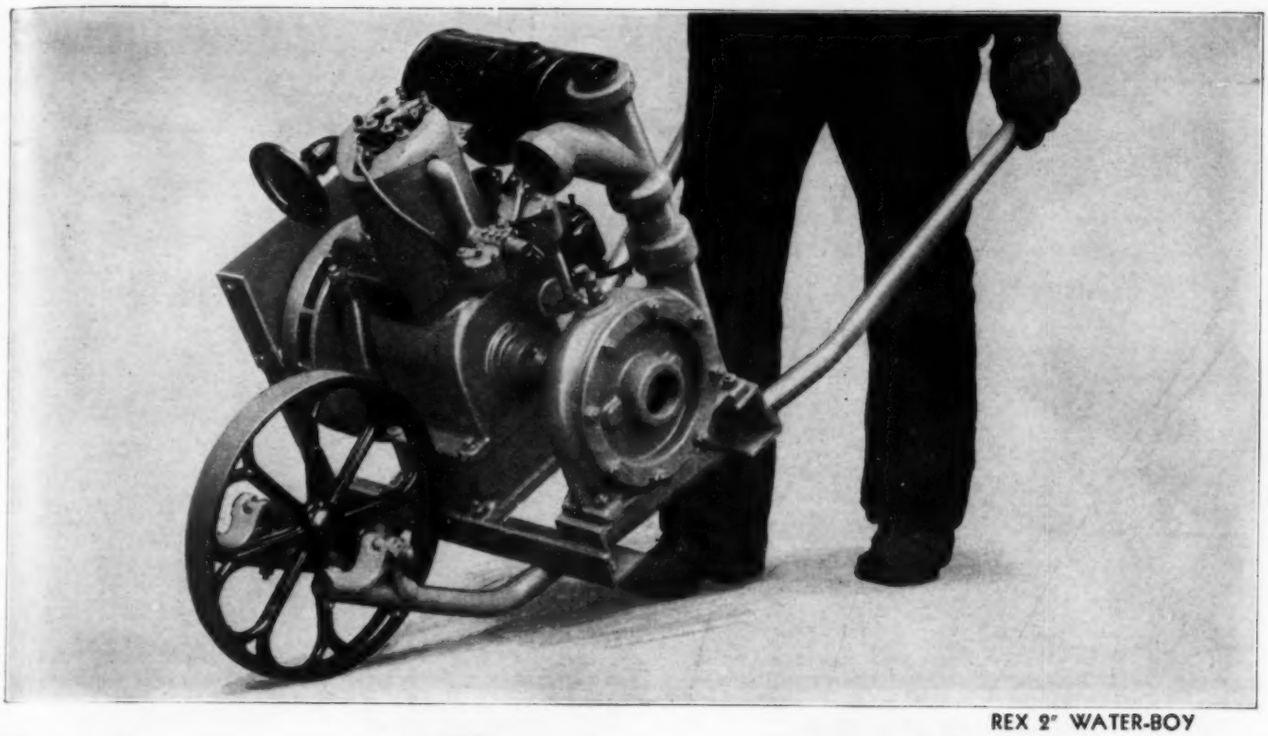
Rex Pumps	☐	Rex 5-7-10-S Mixers	☐	Rex Plaster and Mortar Mixers	☐
Rex Road Pumps	☐	Rex 14-S Mixers	☐	Rex Pavers	☐
Rex Tilting Mixers	☐	Rex Saw Rigs	☐	Rex Big Mixers	☐

Name.....

Address.....

City..... *State*.....

REX PUMPS



REX 2" WATER-BOY

More Super Values

$170.00

LIST AT MILWAUKEE

Something New in a 2" Centrifugal

Don't you believe that there's nothing new under the sun. This Brand New Rex Water-Boy Pump proves that there is.

It's a brand-new, high capacity, 2-inch Centrifugal to meet contracting needs that have never been fully met before.

Weighing only 300 pounds, the Water-Boy is mounted on a wheelbarrow frame. One man can move and place it most anywhere.

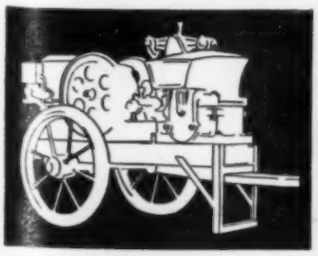
As for capacity: 4800 to 9300 gallons per hour is not at all unusual.

The engine is automotive in type—completely enclosed and self-oiling. And this engine is fully equipped with high tension magneto and everything.

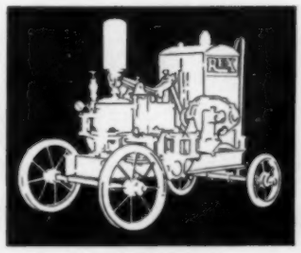
Pump connection is direct through a flexible coupling.

In short, you get the finest type of centrifugal that can be built—in a new, efficient package—a package that is easily moved and handled.

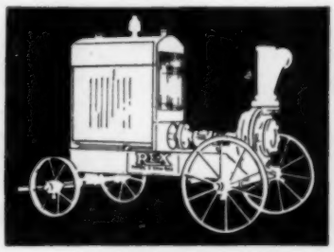
And all at a price that makes comparative pumps look extravagantly expensive.



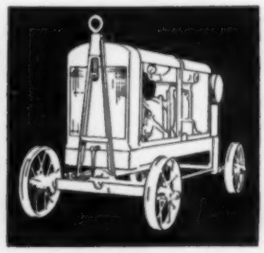
Rex Diaphragms



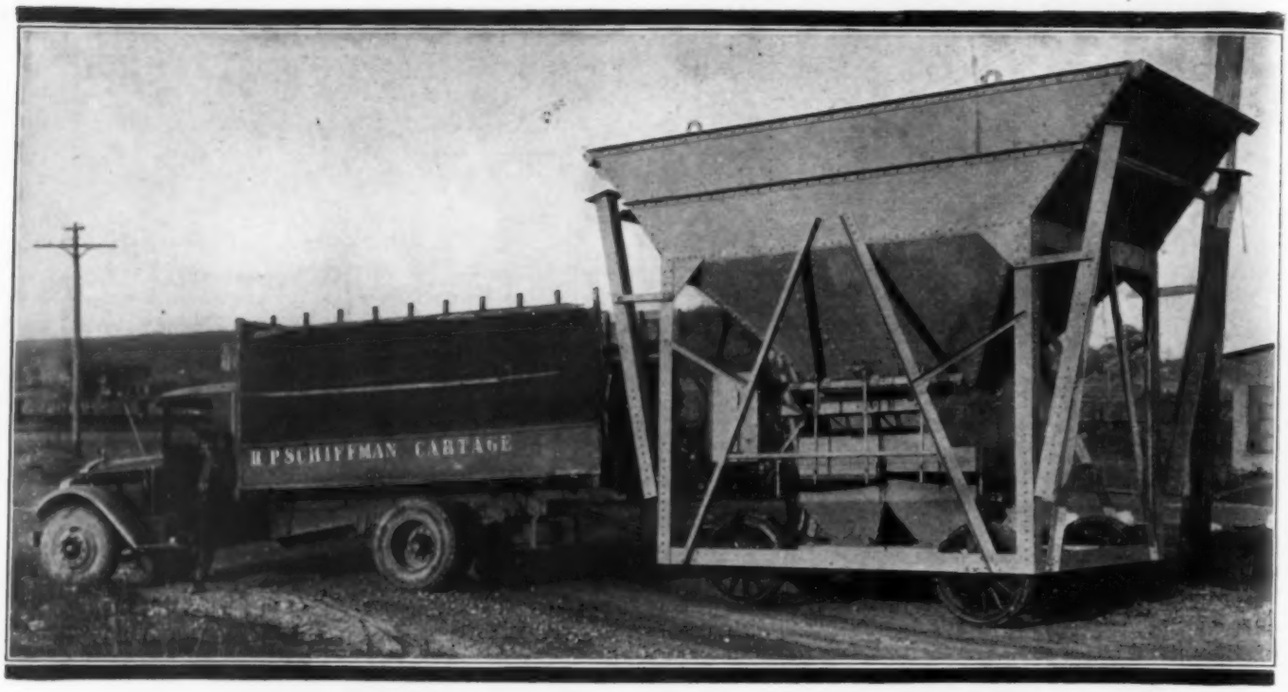
Rex Plunger Pumps



Rex Centrifugals



Rex Road Pumps



AND *NOW* — NEW PORTABILITY

JUST a step ahead — that describes the New Butler Road Builders' Bin.

It's made in three sizes — 36, 40 and 65 cu. yds.— and meets all the requirements of portability, strength, capacity, loadability and fast operation. It's built for a purpose — and it fits.

It may be mounted on wheels or not, as you wish.

This new bin is regularly equipped with non-clogging, quick-closing, quadrant type gate for filling proportioning hoppers.

In combination with the Butler Steel Scale and Weighing Hopper it represents the most modern thing in road construction equipment.

We will be glad to give you full particulars.

BUTLER BIN COMPANY, *Waukesha, Wisconsin*
Representatives in fifty principal cities.

Type "V"—36 cu. yd. Road Builders' Bin with Weighing Batchers completely assembled.

BUTLER
Steel BINS

STOP WASTING

Time–Labor–Lumber

Eliminate broken horses, save storage space, save handling costs by using permanent, folding steel horses.

Toledo Horses

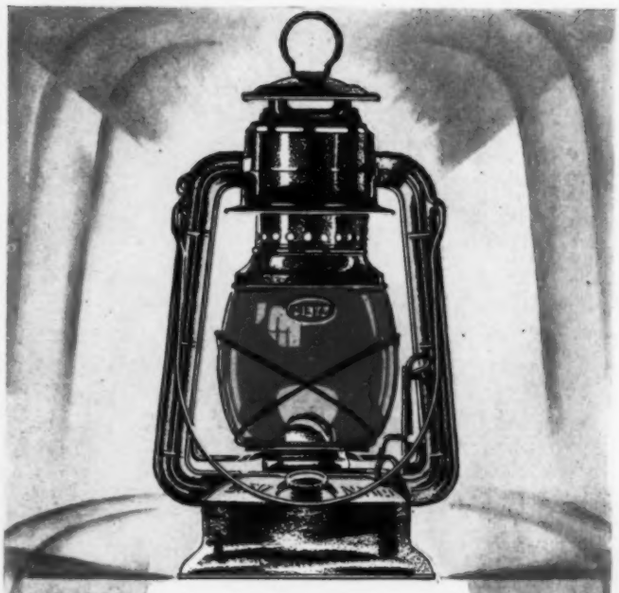
The sturdy ribbed steel frame is quickly opened, the jaw fits and grips standard sized lumber used as cross bar, the toggle brace clicks into position and the horse is ready—rigid, strong, indestructible, never needs repairs. Available in 8 heights—18 to 60 ins. Their moderate cost is quickly absorbed by the frequent saving of time and material

Ask your dealer for the genuine TOLEDO Folding Steel Horse

THE TOLEDO PRESSED STEEL CO.
TOLEDO : OHIO

Manufacturers of the Toledo Torch—the best highway safety light

Save with Steel



IN THE PUBLIC EYE

DIETZ Red Lanterns are "second nature" warning lights for roadside use —instantly understood —instinctively obeyed— the most dependable protection afforded at low cost.

"Little Wizard" Cold Blast Lantern (illustrated) is one of several dependable "all-weather" lanterns recommended by Dietz for use on contracting jobs. This handy little lantern has an extra BIG light—an increased safety factor that often gives it preference.

Consider "Little Wizards" when ordering your next lot of new lanterns.

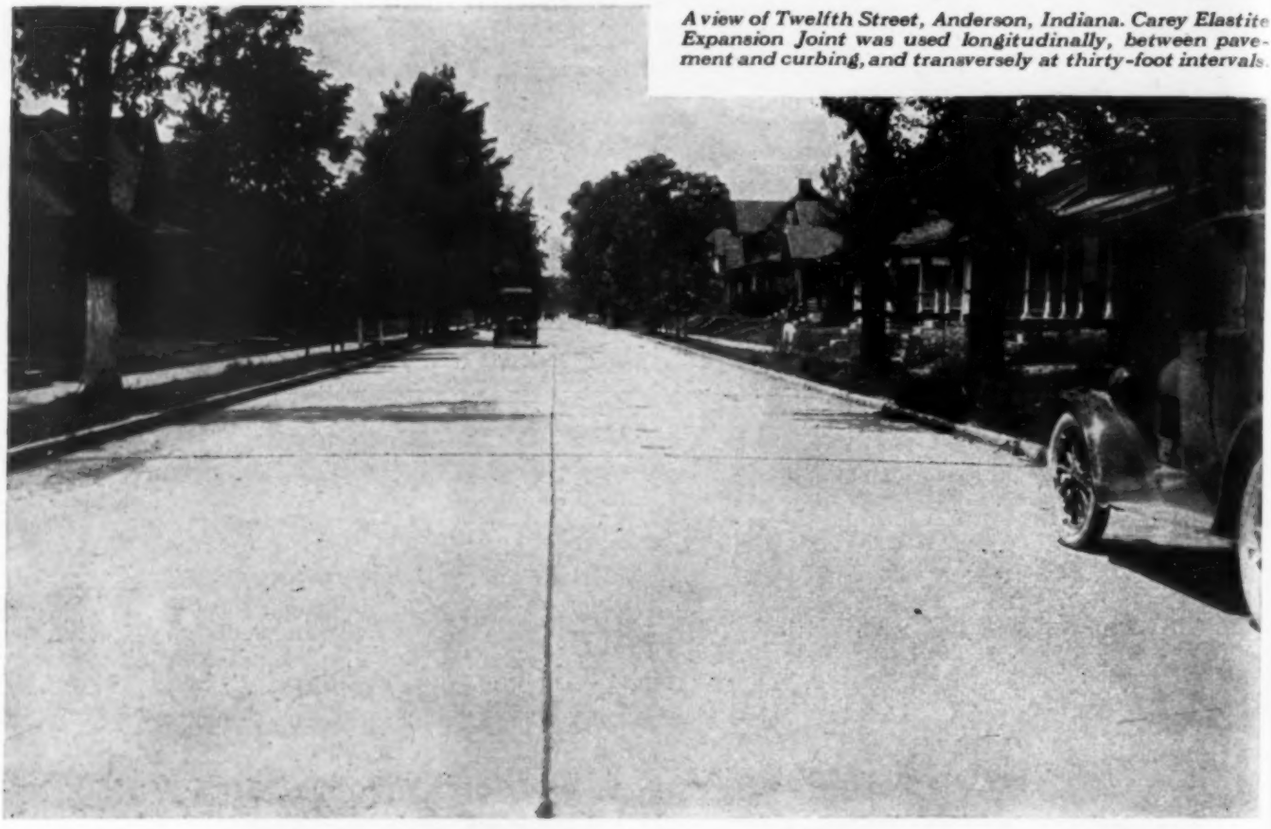
USE RED
No other color means DANGER

R. E. DIETZ COMPANY
NEW YORK

Largest Makers of Lanterns in the World

FOUNDED 1840

"Back home again in Indiana,"



A view of Twelfth Street, Anderson, Indiana. Carey Elastite Expansion Joint was used longitudinally, between pavement and curbing, and transversely at thirty-foot intervals.

on ribbons of smooth concrete

MOTORISTS through the Hoosier State have good reason to remember many of those concrete city streets. *Smooth,* foot after foot and furlong after furlong—*lastingly* smooth because they are lastingly protected, by Carey Elastite Expansion Joint . . . "Shock-absorbers" built right into the concrete!

Carey Elastite Expansion Joint is made in sandwich form—an asphaltic composition filler between two tough sheets of asphalt-saturated felt. It "gives and takes"—protects concrete against the strains of contraction and expansion. Uniform in consistency in the hottest or coldest weather—keeps its shape—prevents chipping and spalling at the joints. Easily and inexpensively installed—used and recommended by engineers and contractors everywhere for concrete construction work. Write for information on Expansion Joint installation.

THE PHILIP CAREY COMPANY *Lockland,* CINCINNATI, OHIO

Carey Elastite
EXPANSION JOINT

MORE FOR YOUR MONEY

WITH added ruggedness and greater power, the Lorain 75 for 1930 gives you even more for your money than the Lorain 75 which broke all Thew sales records in 1929.

THEW-LORAIN

GREATER POWER

Lorain 75 Dragline working on Saluda Dam, S. C.,
owned by Arundel Corporation, owners of 3 Lorain 75's.

A BIGGER, more powerful Gas, Diesel, or Electric motor—a longer crawler, heavier construction from crawler to boom—are that much more assurance that this famous machine will stand up and take it month after month.

THEW-LORAIN 75

THEW CENTER DRIVE

STRONGER–FASTER

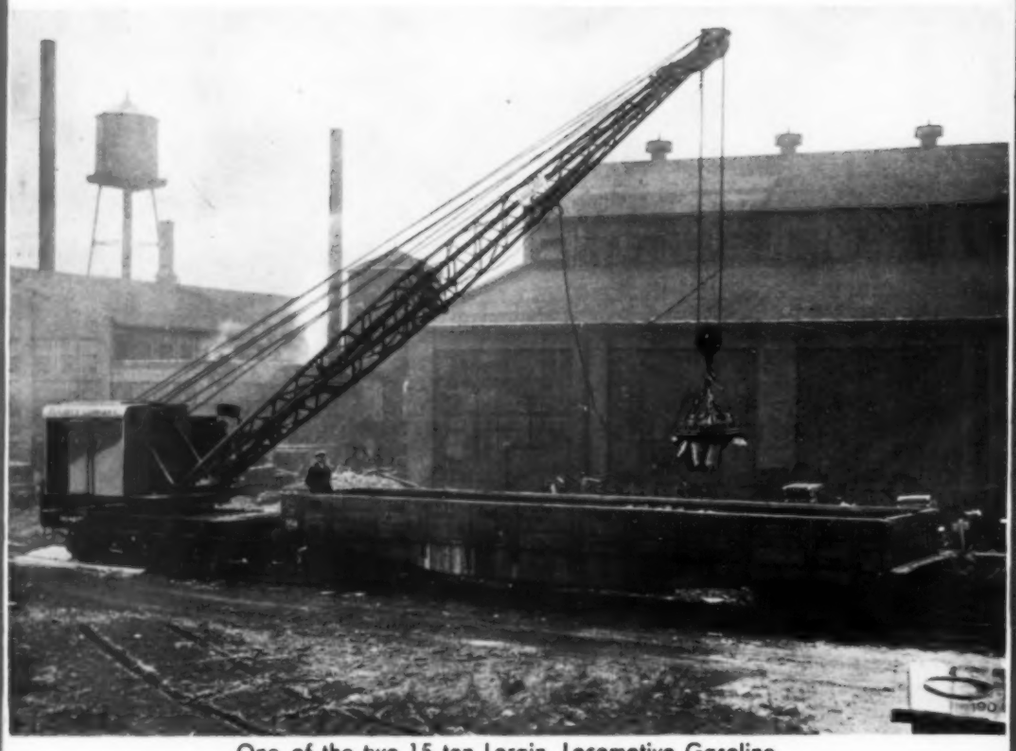
2 Lorain Cranes working on Buffalo City Hall excavation. Lorain 55 shovel in background.

AND with this ruggedness and power you'll find the Lorain 75 faster with split second control of each operation. You'll find it ready to extend itself to the capacity and skill of the operator—a better profit earning machine than ever before.

THEW-LORAIN 75

THEW CENTER

BUILT TO ONE BASIC DESIGN



One of the two 15 ton Lorain Locomotive Gasoline Cranes owned by the Elliott Company, Pittsburgh, Pa.

ALL Thew Lorain machines, ¾ to 1¼ yd. capacities; shovels, cranes, clamshells, draglines, backdiggers, locomotive cranes—are built to the Center Drive design, with power applied directly through fewer shafts and gears, with fewer parts to wear.

THE THEW SHOVEL CO. Lorain, Ohio

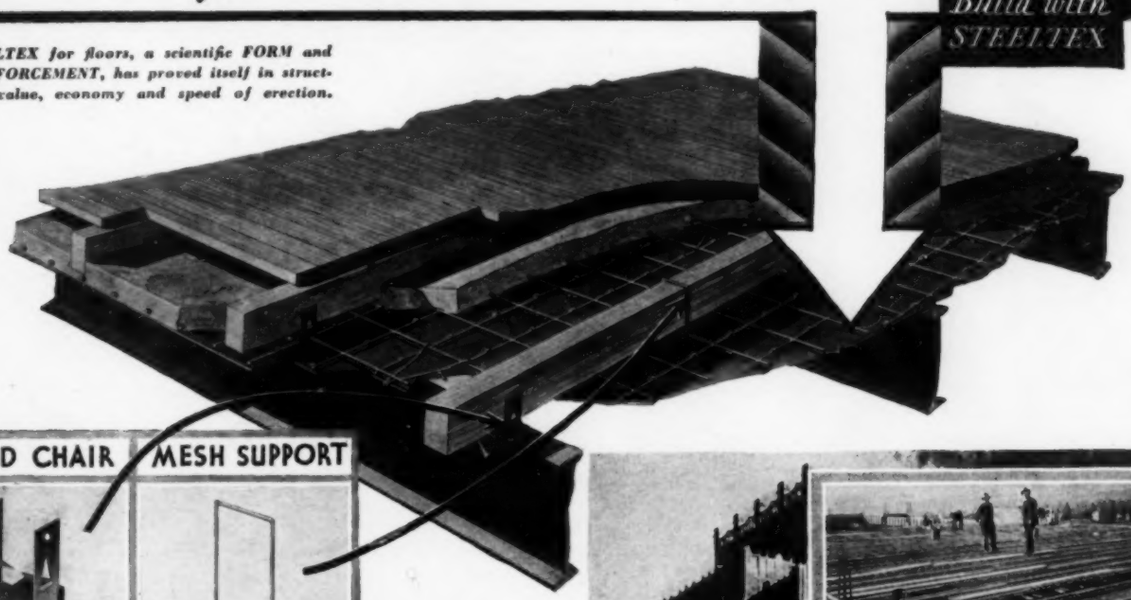
THEW-LORAIN 45-55-75

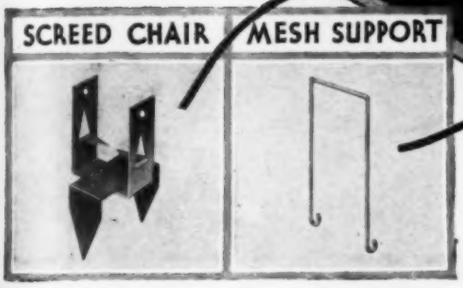
FOR MODERN CONSTRUCTION

use modern methods . . . here is the way: STEELTEX for floors

Build with STEELTEX

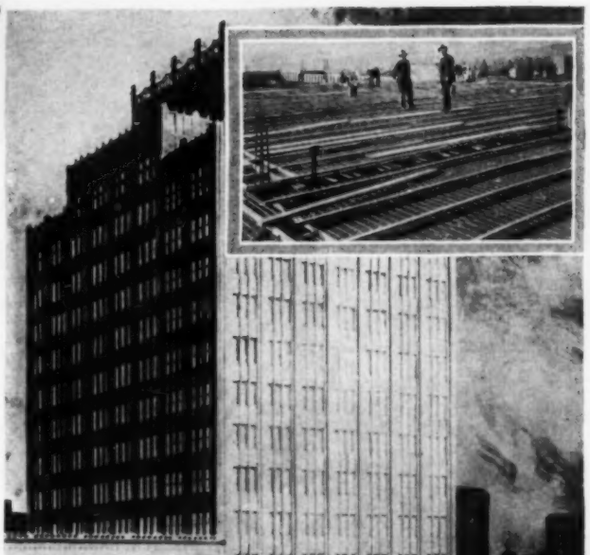
***STEELTEX** for floors, a scientific FORM and REINFORCEMENT, has proved itself in structural value, economy and speed of erection.*





(Above) Cutaway illustration showing application of STEELTEX for floors. Indicating arrows show the use of STEELTEX Screed chair and Mesh Support.

***STEELTEX** reinforcement,—**STEELTEX** Screed Chair,—**STEELTEX** Mesh Support:*
These three units used, as shown above, constitute the *STEELTEX* construction method for reinforced concrete slabs with wood flooring.
For wood floors, it is necessary to place the screeds over the concrete slab . . . the finished flooring is nailed to these screeds. In order for the concrete to flow under and embed these screeds, they are placed on and nailed to the *STEELTEX* Screed Chairs which automatically align and level the sleepers. The *STEELTEX* Mesh Supports are used to engage (by hooking) the transverse wires of *STEELTEX*. These mesh supports prevent sagging without the necessity of stretching.



Reinforcement of *STEELTEX* is composed of a network of electrically-welded, 12 gauge steel wires (spaced 3 by 4 inches . . . and heavily galvanized). This network is attached to a tough, corded-backing by means of wire crimps . . . insuring automatic embedment of wire network in the slab when the concrete is poured onto *STEELTEX*. The *STEELTEX* backing aids in curing, minimizes droppings and prevents loss of concrete.

Write for further details and descriptive literature . . . sign and mail the coupon.

STEELTEX is quickly rolled in place.

The Morwood Building, Austin, Texas. STEELTEX for floors used throughout. Giesecke & Harris, architect.

(Inset above,—a Utah job) Screeds in place over STEELTEX...ready for concrete pouring.

NATIONAL · STEEL FABRIC · COMPANY

UNION TRUST BUILDING — Pittsburgh Steel Co. — PITTSBURGH, PA., U.S.A.

The National Steel Fabric Company, Dept. 65-B

Gentlemen:—Please send (free) descriptive *STEELTEX* literature, for floors ☐ for roofs ☐ for interior plaster ☐ for stucco ☐ for brick and stone veneer ☐.

Name.....

Address.....

City..... **State**.....

Adding Days to Your Working Week

COLPHALT is the cold process asphalt emulsion that is adding days to the working week of road builders because it comes *ready to pour.* No heating, no waiting for the weather "to clear up".

And because ordinary cold or slightly wet weather does not interfere, there is seldom a day lost. Road is open to traffic as soon as completed. There is no surfacing material in the world that is as easy to use, gives as great a benefit and saves so much. It is quick penetrating and a binding agent for any and all road building materials.

Widely used in Europe and now being used in America with positively amazing results. Manufactured by us as the sole American licensees under the patents.

Write for construction data and sample for proof-test—the tests you can make in your own office will prove to you beyond all shadow of doubt the wonderful performance of this remarkable material.

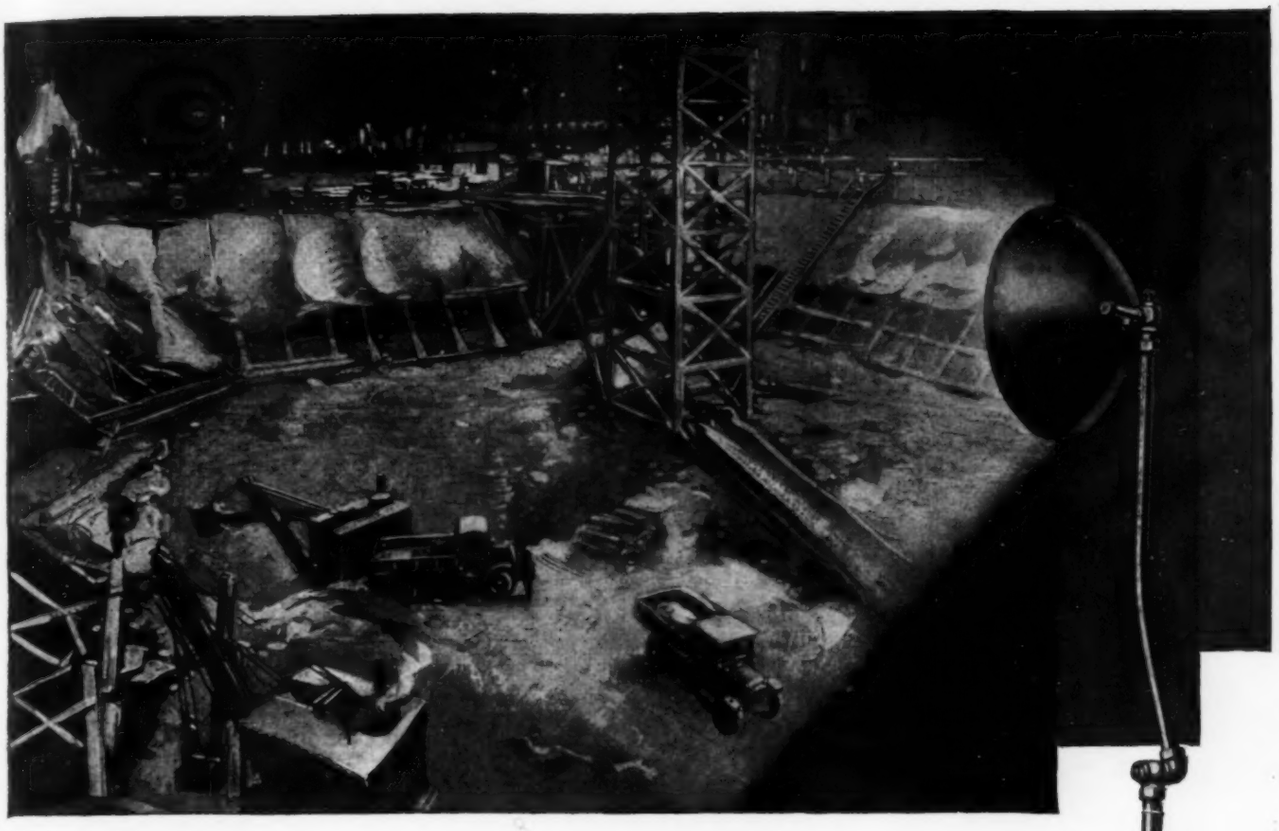
THE COLPHALT COMPANY OF OHIO
604 Western Reserve Building · Cleveland, Ohio.

CORKIN JOINTS

Corkin waterproofed expansion joints—made of granulated cork, asphalt, and fillers—combine extreme compression ability and resilience. Can be compressed to half thickness and will return to five per cent of normal in 24 hours.

COLPHALT

The Cold Process Asphalt Emulsion



Be Prepared—
with CARBIC LIGHT

Wherever a quick portable source of night illumination must be had Carbic Flood Lights can be put into play instantly.

Are you adequately equipped with Carbic Lights?

Make sure of a sufficient source of good working light for every night job.

The Carbic Flood Light supplies strong, diffused illumination capable of penetrating fog, steam and smoke to a remarkable degree.

Carbic Lights defy wind driven storms,—are safe, convenient, and economical. Their simple, rugged construction guarantees years of continuous service.

Carbic is distributed by the Union Carbide Sales Company through its national chain of warehouses and is sold by jobbers everywhere.

CARBIC
PROCESSED CARBIDE FOR CARBIC LIGHTS & GENERATORS

OXWELD ACETYLENE COMPANY

Unit of Union Carbide and Carbon Corporation

NEW YORK CITY
Carbide and Carbon Building

UCC

CHICAGO
Carbide and Carbon Building

SAN FRANCISCO
Adam Grant Building

Oxweld Acetylene Company C.M. 3-30
205 East 42nd Street, New York, N. Y.

Without obligation, I would like to have additional information on Carbic Lights.

Name .....

Street Address .....

City ..... *State* .....

2 new improvements

DU

LESS FUMES
from Red Cross Extras

CONSTANTLY working to improve its explosives, the du Pont Company has recently made a change in Red Cross Extras . . . a change which means a very material reduction in poisonous fumes. These new Red Cross Extras can now be used in numerous underground operations where an ammonia dynamite will give satisfactory execution at a lower cost than gelatin. In the past, Red Cross Extras have been found undesirable in some places on account of fumes. With the new improvement, workers will be able to return to the face with safety and comfort after Red Cross Extra shots are fired.

Above
A general view of the Kyrock Plant, located at Kyrock, Kentucky. Kyrock for paving purposes is quarried here.

Below
Drillers at work in preparation for a blast in the Atlas Gypsum Corporation's mine in New York State.

Above
Drilling in the roof of the Chateaugay Ore & Iron Company in Northern New York State in preparation for a shot that will extend the drift further along the vein of ore.

in explosives . . . from

PONT

Du Pont Extras—MORE COHESIVE—will hold better in uppers

THE new improvement in the formula of du Pont Extras makes these powders more cohesive. This means that these low-density ammonia dynamites which have proved very economical in some operations will now stick better in upward-pointing bore holes. They can be employed more satisfactorily than heretofore in mines where the system of blasting requires a large number of uppers. Their water resistance has also been increased by the change. With these two recent changes, du Pont Extras and Red Cross Extras retain all their other excellent qualities.

The United States Gypsum Company mines Gypsum at Grand Rapids, Michigan. Du Pont Dynamite is used.

Rock excavations in the cut south of Manitou, New York. Du Pont Explosives were used for blasting operations to clear right of way for New York Central tracks.

DU PONT

REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & CO., INC. — *Explosives Department* — Wilmington, Delaware

in London

. . .

COLAS HIGHWAYS

best serve the demands of modern traffic

Keystone Photo

Trafalgar Square, LONDON, ENG.

THE pavements in the commercial centers of the world must stand up under the terrific strain of modern traffic. Engineers in London, after exhaustive tests under actual traffic conditions, chose COLAS for the surfacing of one and a half million square yards of streets during 1928—a convincing proof of the superiorities of this cold asphalt road emulsion.

In America, too, as well as in every other part of the world, COLAS is proving its merit. For non-skid, durable, water-, heat-, and frost-proof roads, built at low cost and with a minimum of delay and equipment, COLAS has no equal.

Write our nearest office for complete information.

THE PROGRESS OF A NATION DEPENDS UPON ITS HIGHWAYS

COLAS ROADS ACCELERATE PROGRESS

FLINTKOTE ROADS INC.

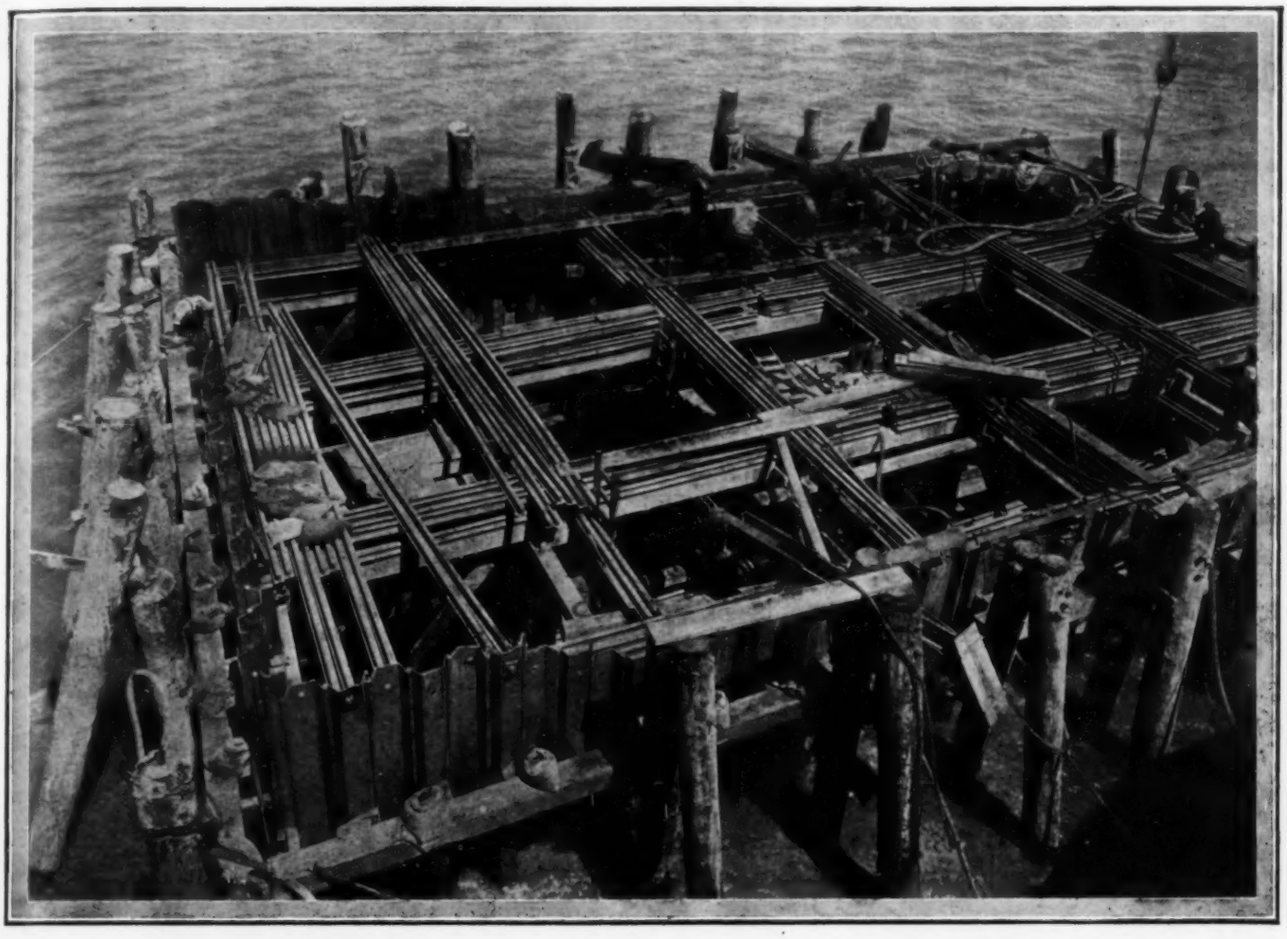
(Colas Licensees)

Pershing Sq. Bldg. NEW YORK — Park Sq. Bldg. BOSTON

Associated Companies Throughout the World

COLAS REG. TRADE MARK

BUILDS DURABLE LOW-COST ROADS



LACKAWANNA Deep-Arch PILING used

in single-wall cofferdam, 58 feet deep, for the construction of Pier 11, Suisun Bay Bridge

This 47- x 71-foot cofferdam was built of Lackawanna Deep-Arch Section DP 165, in 65-foot lengths. The steel sheet piling was driven to an average of 3 feet into the shale rock bottom, timber bracing sunk to position inside, and the cofferdam unwatered to rock, 58 feet below water level.

Three 10-inch centrifugal pumps unwatered the cofferdam. After unwatering, a single Pulsometer pump was sufficient to hold down the leakage.

Upon completion of this pier, the sheet piling was pulled and used at another of the piers.

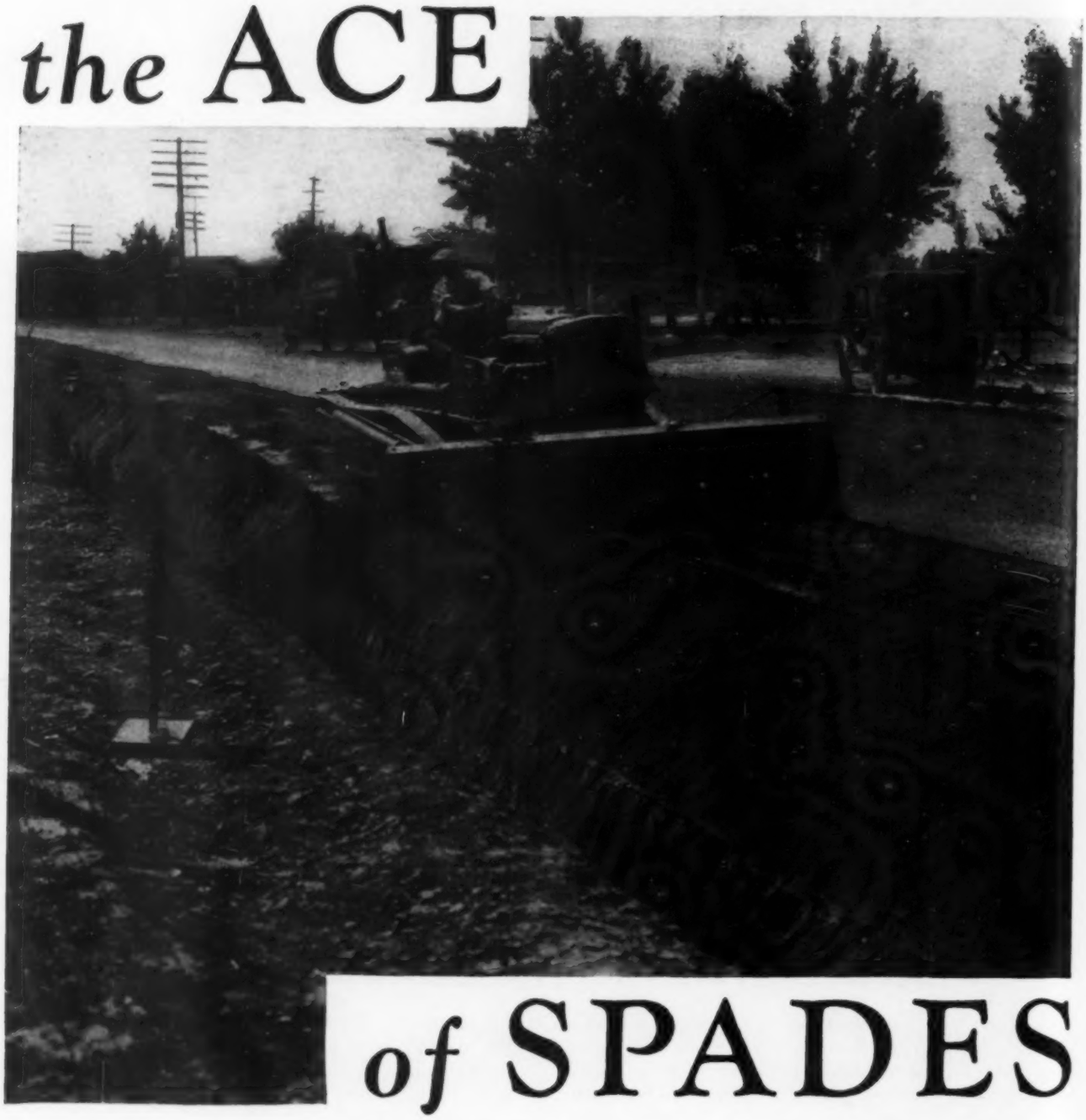
Contractors*—Siems, Helmers and Schaffner, Inc. —*St. Paul, Minn.

BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa.
District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, St. Louis
Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Los Angeles, Seattle, Portland, Honolulu.
Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City

BETHLEHEM

THERE IS A LACKAWANNA SECTION FOR YOUR PARTICULAR PURPOSE

the ACE *of* SPADES



THE "Caterpillar" Tractor likes a back-filling job—it proves its traction by the way it rides the soft soil; the power by the volume of earth that pours off the blade; its speed by the number of men with shovels it replaces. Back-filling after gas or water mains or cable have been laid is an ideal job for the "Caterpillar" to prove its ability to do things *better, quicker, cheaper.*

Prices—f. o. b. Peoria, Illinois

TEN . . .	$1100	TWENTY .	$1900
FIFTEEN .	$1450	THIRTY .	$2375
SIXTY . .	$4175		

Caterpillar Tractor Co.

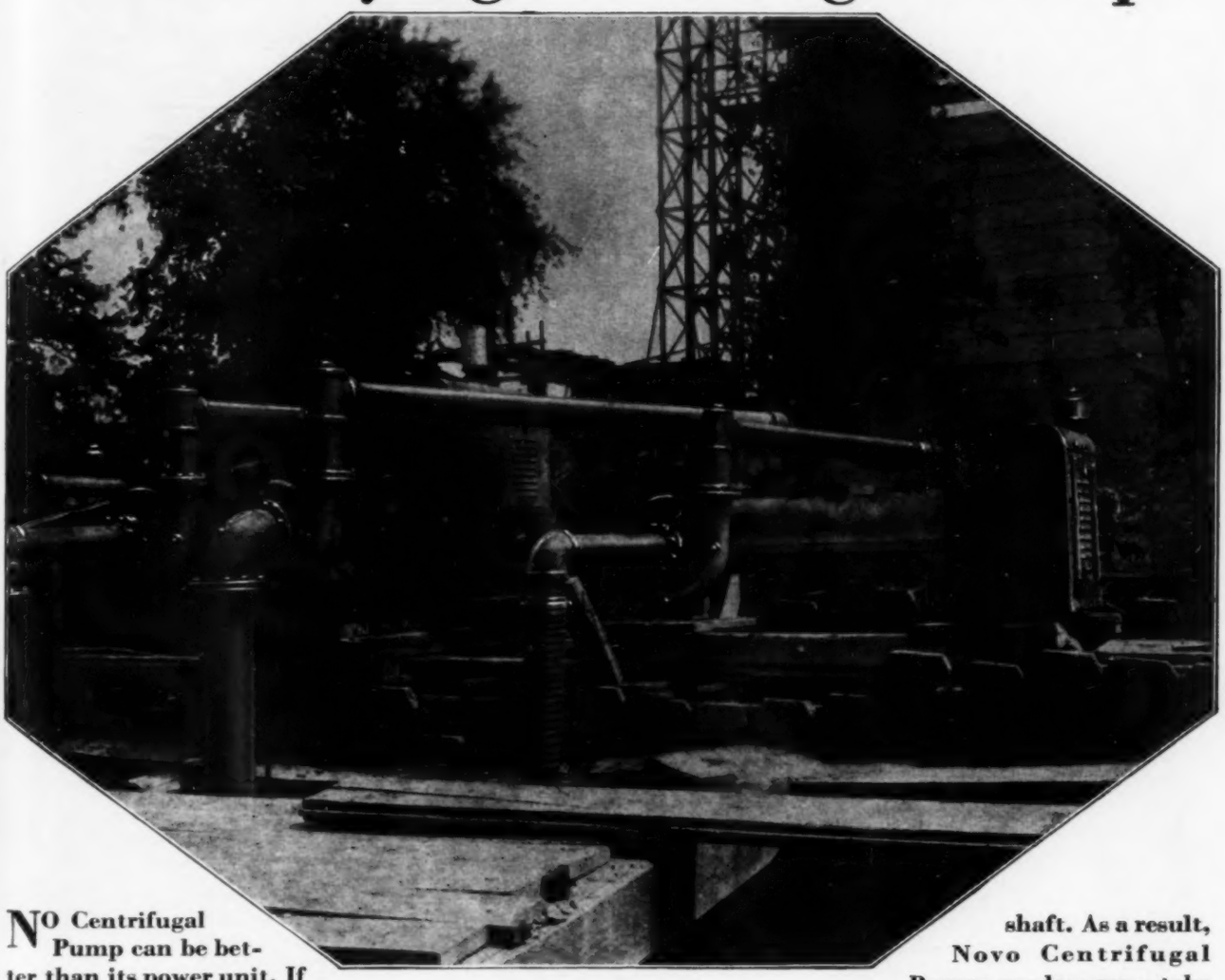
PEORIA, ILL. *and* SAN LEANDRO, CALIF., U. S. A.

Track-type Tractors Combines Road Machinery

(There's a "Caterpillar" Dealer Near You)

CATERPILLAR
REG. U.S. PAT. OFF.
TRACTOR

Give the Engine Its Due When Buying Centrifugal Pumps



Tennessee River job at Knoxville, known as the Cherokee Bridge, on which twelve Novo outfits—pumps and hoists —are trimming costs to the core

NO Centrifugal Pump can be better than its power unit. If the engine fails, the pump stops. And the engine is the biggest factor in high or low operating costs.

That's why Novo Direct Connected Centrifugal Pumps have a big lead over the field. They are the only Centrifugal Pumps powered with the famous Novo Rollr Engines—with Timken Roller Bearings on the crank shaft and drive shaft. As a result, Novo Centrifugal Pumps use less gas—take only a quarter turn right hand crank to start—are vibrationless in operation, compact, overpowered and require only a minimum of attention.

In addition, the electric welded tubular constructed frames provide far greater strength and rigidity—at the same time eliminating much unnecessary weight.

The Novo Pumping Handbook is helping many contractors to lower their water handling costs. It covers all types of pumping jobs—with Pressure, Diaphragm and Centrifugal Pumps. Send the coupon for your copy

NOVO
PUMPS—ENGINES—HOISTS

NOVO ENGINE COMPANY
214 Porter Street, Lansing, Michigan
Clarence E. Bement, Vice-Pres. and Gen. Mgr.

Please send me the Novo Pumping Handbook.

Name.....

Address.....

City.....

State.....

Grading El Paso Rim Road
with Sullivan Busters

A contract for grading the Rim Road at El Paso went to the El Paso Bitulithic Company—when they based their bid for grading on using Sullivan Busters and Sullivan Vibrationless Compressor.

"Caliche," the material to be excavated was a mixture of hard clay and sand with limestone blocks.

The Busters took out the "Caliche" rapidly. And they smashed the limestone as easily as they do concrete.

President Collins expressed satisfaction with the speed of these tools and the smooth operation of the Vibrationless Compressor.

Visiting contractors astonished at smooth operation of Sullivan Compressors. Both buy.

While the Sullivan Compressor was at work on Rim Road, two contractors called to see it. Both were astonished to find that Vibrationless Compressors were really Vibrationless. And they, too, have ordered Sullivans.

The excavation is now completed. And the equipment is earning profits on other contracts.

You can use Busters to cut concrete or asphalt, knock out retaining walls, channel new buildings for plumbing, tamp backfill, or drive sheet piling.

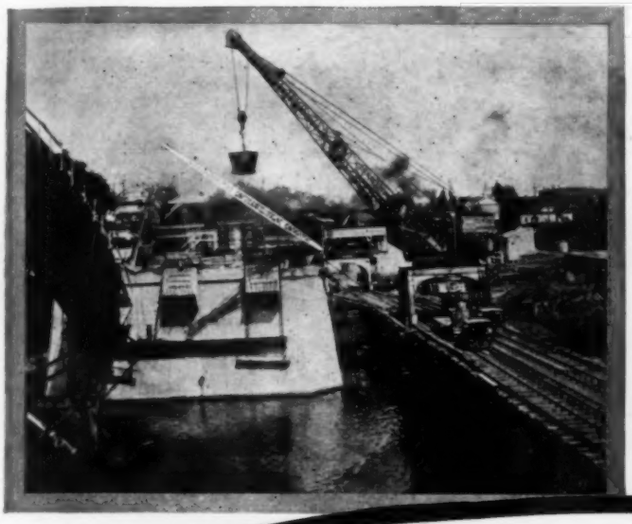
All of these jobs, and others, are illustrated and described in a new picture book we would like to send you.

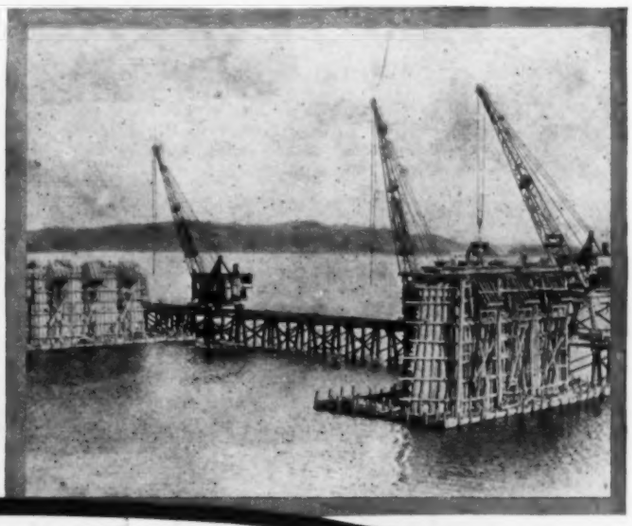
Write today for Booklet 87-B.

SULLIVAN AIR POWER EQUIPMENT

Sullivan Machinery Company
816 Wrigley Bldg., Chicago

8 WILEY WHIRLEYS *on the Susquehanna . . .*





. . . again this machine proves its superiority on Bridge Construction

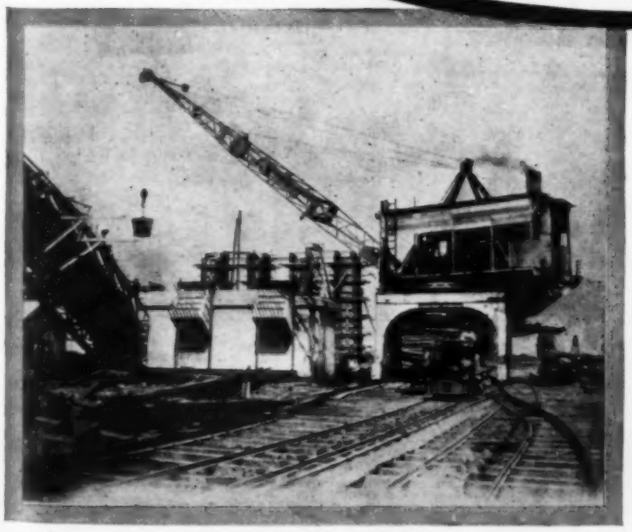
Serving a variety of purposes and making possible a method of construction that reduced time and cost, WILEY WHIRLEYS have again shown themselves profit making equipment on the construction of the Columbia-Wrightsville bridge.

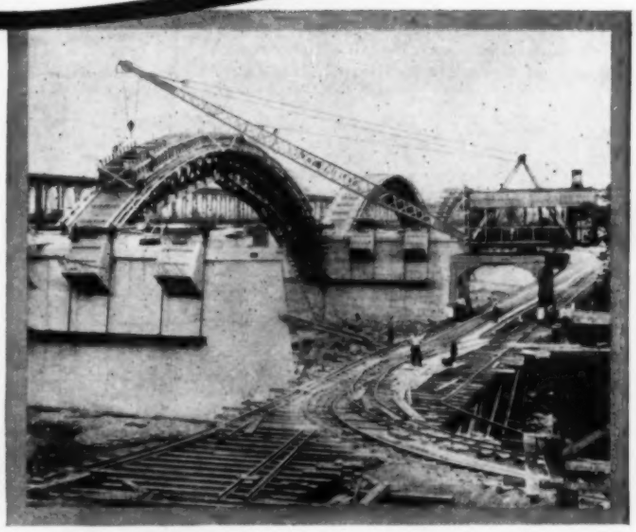
Handling heavy loads at a great radius, with full circle swing and live boom—fast, versatile and mobile — WILEY WHIRLEYS are proving indispensable on the Susquehanna job.

Here they are used in the erection of construction trestle and steel arch centering, setting cofferdam cribs, removing excavation, setting and stripping forms and concreting arch ribs with bottom dump buckets. The gantry mounting has resulted in great economy.

Since 1919 we have been building WILEY WHIRLEYS *exclusively*. Tell us your conditions and send for our new illustrated catalog. There is no obligation.

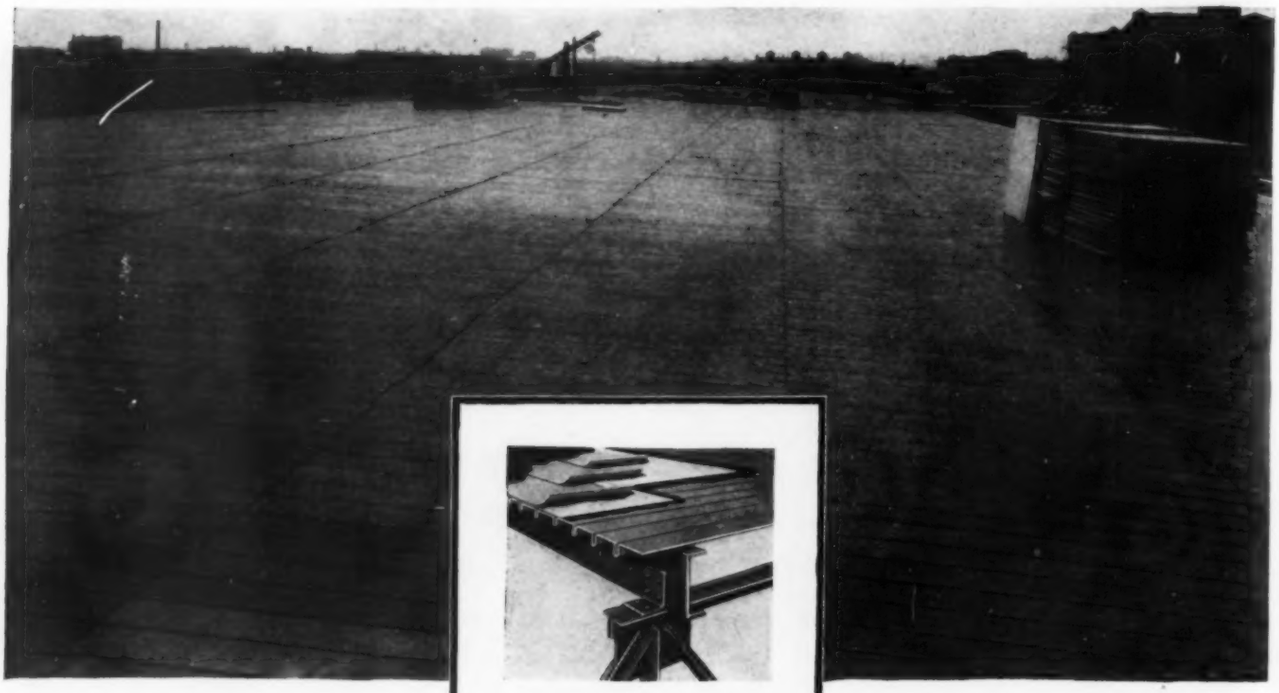
The Dayton-Whirley Co.
DAYTON, OHIO





A TRAVELING, REVOLVING, LONG REACH, HEAVY DUTY, STEEL DERRICK

. . . . "the Most Economical Permanent Roof Obtainable"



Cross section of Mahon Steel Roof Deck showing interlocking principle and the application of insulation and roofing material.

MATERIAL

Mahon Steel Roof Deck Plates are rolled from special, tight-coated galvanized copper-bearing steel, and require no painting or maintenance whatsoever. The bright galvanized ceiling surface, presented by Mahon Deck installed, is a desirable asset from a standpoint of light reflection.

IN PERMANENT roof construction, weight is the cost determining factor. When light weight is combined with fire-safety and permanence in a material requiring absolutely no maintenance, you have unquestionably the most economical permanent roof obtainable. ¶ Mahon Steel Roof Deck meets these specifications perfectly . . . it weighs only five pounds per square foot, including insulation and roofing material. In buildings designed to carry this extremely light roof load, remarkable savings can be effected through the use of lighter members in the supporting structure. ¶ The millions of square feet of Mahon Steel Roof Deck already installed on industrial and commercial buildings throughout the country, bear evidence to the fact that many architects and builders are taking advantage of the outstanding economy of this type of permanent roof construction. Write for our complete data book and our folder, "Facts and Figures."

THE R. C. MAHON COMPANY
Detroit, Michigan

Branch offices in New York, Chicago and Pittsburgh—Representatives in all principal cities.

MAHON
STEEL ROOF DECK

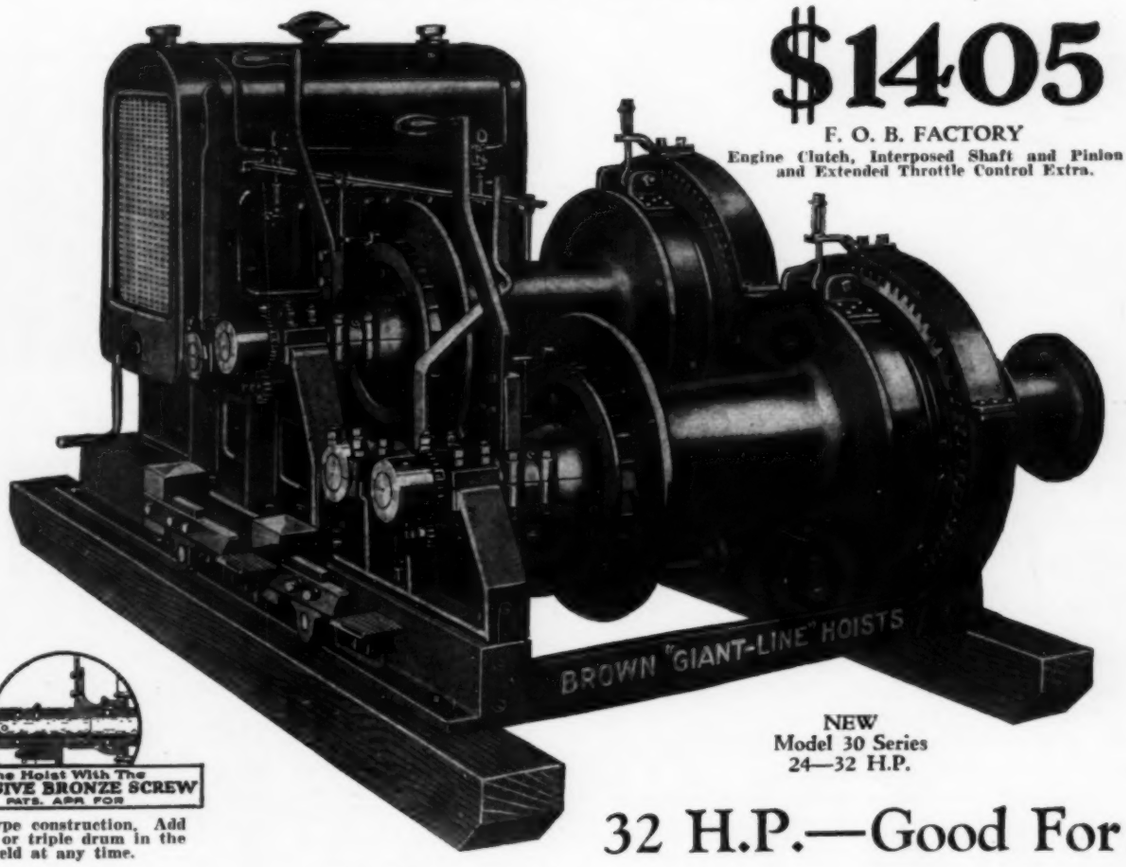
Manufactured in Galvanized Copper Bearing Steel in either 18 or 20 Gauge

The illustration above shows Mahon Steel Roof Deck installed on a new building for the Robert Beyer Corporation, Brooklyn, N. Y.

A CHALLENGING VALUE In HOISTS

$1405

F. O. B. FACTORY
Engine Clutch, Interposed Shaft and Pinion and Extended Throttle Control Extra.



NEW
Model 30 Series
24—32 H.P.

The Hoist With The EXCLUSIVE BRONZE SCREW PATS. APP. FOR

Unit type construction. Add double or triple drum in the field at any time.

Specifications

Equipped with new Series 24, 28 or 32 H.P. Hercules Power Unit; rating 3,000 to 4,000 pounds single line pull at 200 feet per minute; Morse Silent Chain final drive; 10" dia. drums; large bronze bushings; Four bolt bearings; Flanged gear guards; Exclusive Bronze Screw Thrust; positive clutch release; Timken and Ball Thrust Bearings; Alemite lubrication throughout; side frames cast separate from base; shrouded pawl ratchet cast separate from drum; spring suspended easily adjusted brakes; non-spreading side frames; machine cut nickel semi-steel gears, etc., etc.

32 H.P.—Good For 4,000 Lbs. at 200 Ft. Per Min.

The New Model 30 Series challenges comparison—in design, in construction and in price!

Good for three wheelbarrow elevator work, 14 cubic foot Mast or Tower Bucket; ½ to ¾-yard clamshell or dipper; 2,000 pound pile driving hammer; ¾-yard dragline scraper and any other job up to 4,000 pounds single line pull—PLUS PRACTICALLY A LIFE TIME OF CAREFREE SERVICE.

Furnished in single, double and triple drum units as well as boom swinger.

One of a standardized series from 4 to 50 Horsepower

1930 Catalog A-1 upon request.

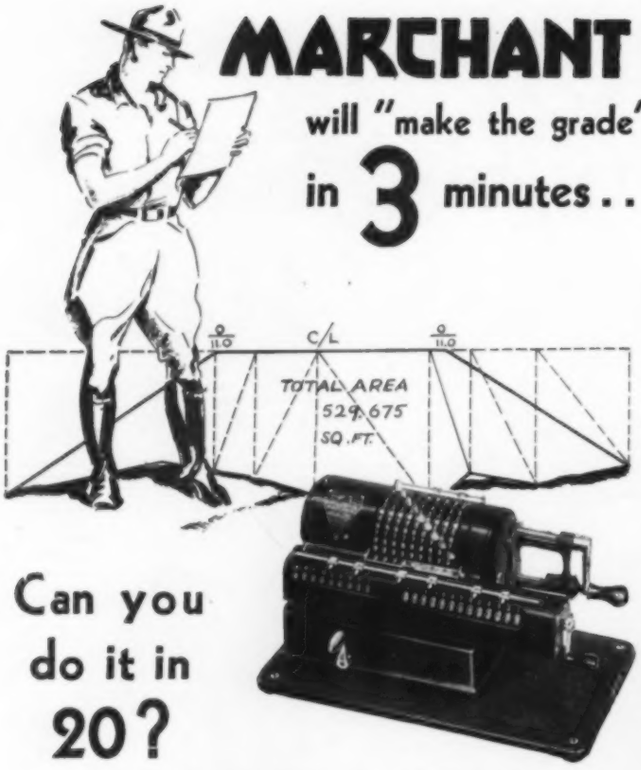
THE BROWN CLUTCH COMPANY
SANDUSKY, OHIO, U. S. A.

SINGLE & MULTIPLE DRUM — REVERSIBLE

BROWN GIANT-LINE HOISTS

NON-REVERSIBLE AND CONVEYOR TYPES

HOIST SPECIALISTS FOR A QUARTER CENTURY



MARCHANT

will "make the grade" in 3 minutes . .

Can you do it in 20?

Figuring the cross section and yardage of a grade crossing, or a fill, is not so complicated. Just a lot of tiresome figures and more tiresome pencil-pushing. And it sure does take *time!*

Why not let the mechanical brain of the Marchant Portable Calculator do all such brain-fagging, time-eating figuring for you?

Much faster—with absolute accuracy—without refiguring or checking back—and leaves *your* brain free for the important jobs.

MARCHANT PORTABLE *Calculator* $125

Adds
Subtracts
Multiplies
Divides

Figures any problem from the simplest to most complicated. Faster and more accurate than a slide rule and has far greater figuring capacity.

Portable, light-weight, compact. Anyone can run it.

Sold under the standard Marchant guarantee. Terms if desired. Mail the coupon NOW!

17 years building calculators, nothing else
Sales and service offices the world over

Free! Marchant Calculating Machine Co.
Dept. 118, Oakland, California
Please send me full information about
☐ Marchant All-Electric ☐ $125 Marchant Portable

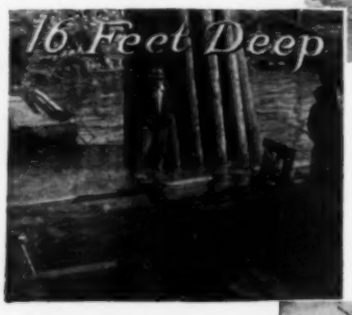
Name_____
Firm_____
Address_____
City and State_____

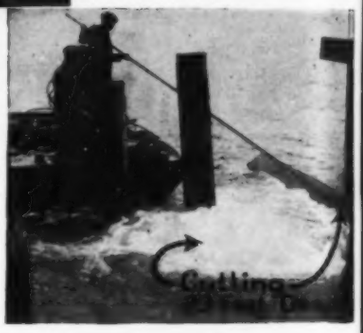
Under-water Service!

2 ft.-16 ft.-20 ft.!

or to any depth in which divers can operate

The AIR-DRIVEN "Wolf" Portable Timber Sawing Machine





(Right) 100—12-in. x 12-in. fir piles in 7 hours all in 20-ft. of water—all within the government requirements "saw off squarely and not varying more than ½-in. above or below the designated level."

"An unqualified success on under-water cutting" says E. R. Leudtke, Superintendent, Greiling Engineering Co., at Frankfort, Mich.

We are indebted to such firms as the following for much valuable information on successful under-water cutting:

Edward E. Gillen, Milwaukee, Wis.; Love Constr. Co., Muskegon, Mich.; Great Lakes Dredge and Dock Co., Albany, N. Y.; Hampton Reynolds, New Orleans, La.; Greiling Eng. Co., Green Bay, Wis.; Vancouver District Sewage & Drainage Board, Vancouver, B. C.

Manufactured by

REED-PRENTICE CORPORATION
Worcester, Mass.

Biggs Will Lay the Pipe, Supervise, and Handle the Whole Job for the Excavating Contractor, If Desired

You can depend on Biggs Steel Pipe and Biggs Service "down to the very last ditch"

Biggs Electrically Welded Steel Pipe is now in service on fourteen large municipal projects. With its smooth interior, maximum structural strength, complete uniformity, and 100% joint efficiency, it has practically eliminated maintenance. The perfected uniformity of Biggs Welded Steel Pipe has won the approval of leading water works engineers, especially for projects where operating conditions are most severe.

Such universal acceptance is not mere happenstance. Biggs Welded Steel Pipe has been subjected to hydrostatic, tension, torsion, and bend tests impossible with any other type of construction. It is your assurance of a safe, dependable, permanent conduit.

Section of Biggs electrically welded steel water pipe, 48-in. diameter, ½-in. wall thickness, being subjected to hydrostatic test of 1000 pounds per square inch in the presence of inspectors representing three important municipalities. The electrically welded seams did not even "sweat" although the vessel was severely distorted.

Biggs 50-in. diameter steel pipe being installed in a river crossing at Flint, Mich. Biggs is equipped to take full charge, at the contractor's request, of pipe installation.

Biggs 54-in. diameter steel pipe being laid at Kansas City, Mo. Biggs specializes in fabricating welded and riveted steel pipe 30-in. diameter and up. Complete data furnished upon request.

Moreover, Biggs places at your command the most complete installation service. Say the word, and we will assume full responsibility for every detail of laying the pipe for you. All the data the contractor can possibly need, supervision, and every conceivable form of personal attention, from an organization with years of intensive training in the field, are yours—to help you get the job and to make the job easy and profitable for you after you get it.

Let us work with you on the next pipe project in your territory.

"Unusual Steel Plate Construction" *illustrates* Biggs' facilities and service. The coupon will bring you a copy gratis of this pictorial folder.

"BUILT BY BIGGS"

Welded Steel Pipe	**Tunnel Shields**
Riveted Steel Pipe	**Air Locks**
Pontoons	**Welded Tanks**
Caissons	**Riveted Tanks**

Steel Plate Construction of Every Description

THE BIGGS BOILER WORKS COMPANY
Kent Street and Case Avenue, AKRON, OHIO

New York **Detroit** **Chicago**

THE BIGGS BOILER WORKS CO.,
Kent Street and Case Avenue, Akron, Ohio.
Send "Unusual Steel Plate Construction"

.....

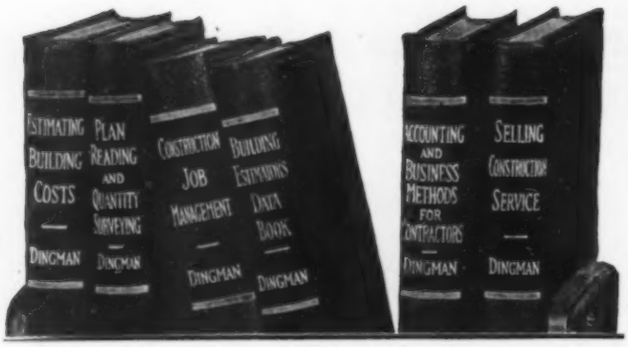
.....

.....

.....

BIGGS Steel Pipe *Riveted and Welded*

The Biggs Boiler Works Co. Akron Ohio



New!
enlarged to six volumes

This Library is for:

Every contractor and builder; every architect and engineer; and every student and executive who is seeking practical help on every-day construction problems.

The New Dingman
Building Contractors' Pocketbook Library

6 volumes, 1149 pages, pocket size, fully illustrated

THE Dingman books have won a wide reputation among builders and building contractors for their sound and practical treatment of construction work. Recently enlarged to six volumes, the Library now embodies a complete source of ready reference as well as a valuable study course.

This set of books will help the building contractor increase the profits of his business—help the construction engineer and foreman to speed up work and promote efficiency—and aid the student in mastering every phase of modern construction practice. A careful indexing system places every valuable fact right at the finger tips. Most of the information can be applied directly to the everyday job—no matter what it may be.

Even though the Library has been enlarged, *the price has actually been reduced!*

Convenient, Concise, Complete

Each one of the volumes in this set is a complete handbook on some important subject. Sturdily bound and pocket size, it will go right "on the job" with you for immediate consultation.

Practical data is given on analyzing a construction job into its component parts—estimating the costs of labor, haulage, equipment, materials, etc.—plan reading and determining quantities from specifications—personnel management—successful supervision of every building operation—efficient and economical business methods—office procedure such as accounting, banking, purchasing, etc. — advertising and selling methods for contracting service—and a complete data book of tables, forms and calculations most frequently used by the builder.

Without a cent of expense—without any obligation—you may examine this new six-volume Library for 10 days. If you decide to keep it, send only $1.50 as your first payment. Then remit $2.00 a month until the entire price of $11.50 has been paid.

FILL OUT AND MAIL THE COUPON

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York, N. Y.

You may send me for 10 days' free examination, the new six-volume Dingman BUILDING CONTRACTORS' POCKETBOOK LIBRARY. I agree either to return the books at the end of 10 days or send a first payment of $1.50 then and $2.00 a month for five months.

Signed .....

Address .....

City and State .....

Official Position .....

Name of Company .....

(Books sent on approval to retail purchasers in the U. S. and Canada.)

C.M.3-30

Mose Is Right . . .

"IF YOU'D always get me chisels like this I never would be broke down!" That's what Mose said about "Clevaloy" Paving Breaker Chisels—and he's right. He runs paving breakers and you can't fool him.

Mose remarked that the first thing he did when he got a new chisel was to see if it had "CRD" stamped on the collar.

That mark identifies "Clevaloy" and Mose knows when he starts a job with a "Clevaloy" chisel it will *last at least twice as long* as ordinary tools.

Make sure your paving breaker chisels are marked "CRD." It insures long life and lower costs.

Chisels made 1¼-in. and 2½-in. wide, 14-in. and 18-in. long under the collar. The moil-point tool can be had in the same lengths.

The Cleveland Rock Drill Co.
3734 E. 78th St., Cleveland, Ohio

Branches and Distributors in Principal Cities

CLEVELAND ROCK DRILLS

It Takes Real Power to do Work Like This

When you hook on to a 42-inch giant elevating grader and pull it through lumpy clay such as pictured, you want a tractor that has plenty of power. In Monarchs you will find a reserve power that meets all emergencies — the kind of power that means profit on a road job where the going is tough.

Extra long tracks give Allis-Chalmers Monarchs extra traction. The steering clutches and truck-type steering wheel enable the operator to steer accurately and naturally even when looking behind to watch his load.

Designed by Allis-Chalmers, made of the finest materials, and built by expert workmen, Monarch Tractors are the finest that money can buy. Yet they offer the lowest cost drawbar horsepower in their class. That is an advantage not to be overlooked. Let us send you prices and complete information.

ALLIS-CHALMERS MANUFACTURING CO.

Specialists in Power Machinery Since 1846

Monarch Tractors Division

SPRINGFIELD, ILL.

"75"—"50"—"35"

Monarchs Help Build the Akron Airport

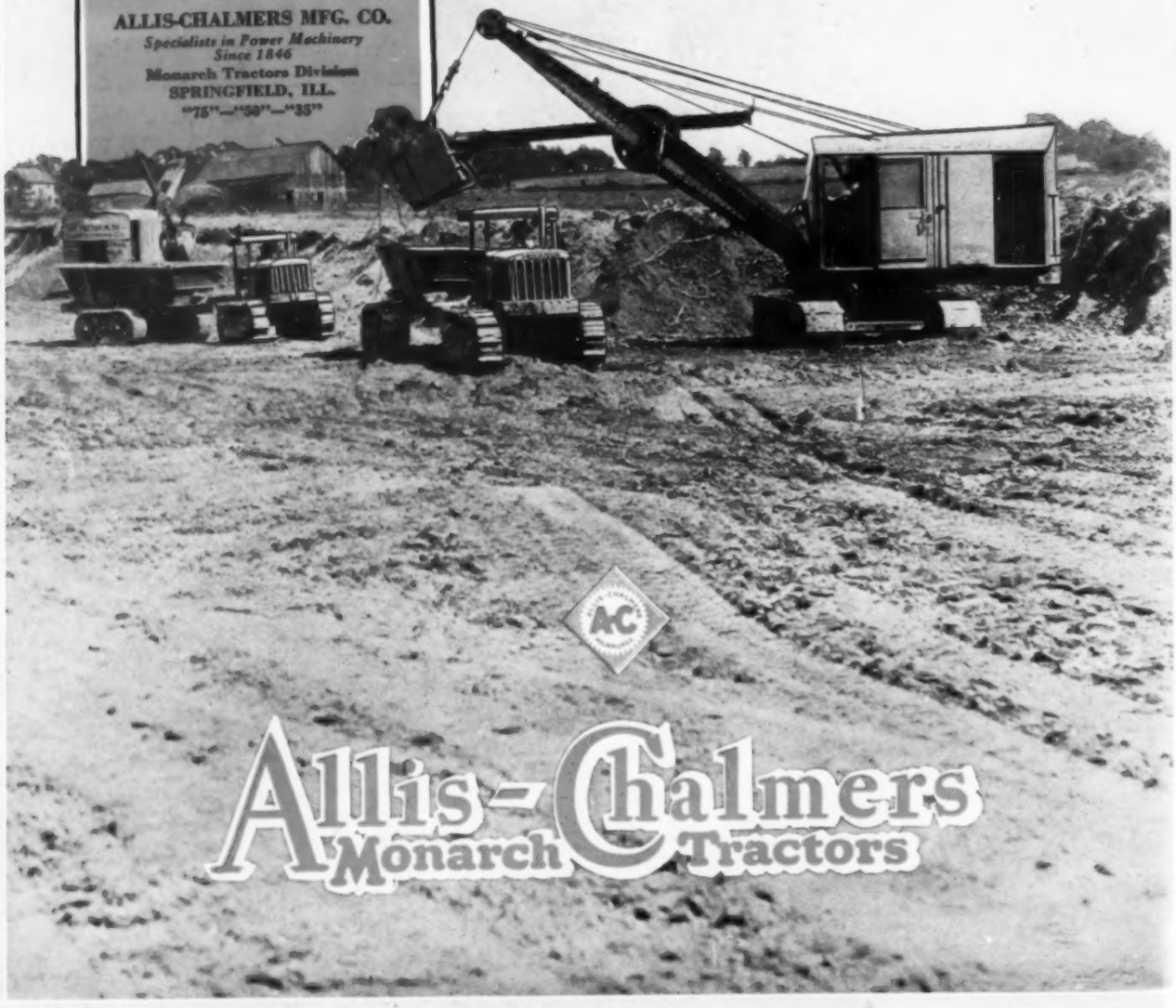
THE grading required to construct the Akron, Ohio Airport and Dock involves the removal of about 1,150,000 cubic yards of earth. The hangar will be the largest ever built.

Two Monarch "50" Tractors have helped to speed the completion of this work.

As the Allis-Chalmers Mfg. Co. has always participated in large projects by supplying power equipment, so are Allis-Chalmers Monarch Tractors playing an increasingly important part in construction work throughout the world.

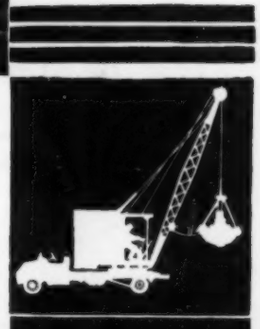
The Monarch "75", "50" and "35" are setting new standards of performance. They offer outstanding operating advantages and perform in a way that wins approval under the most difficult conditions. Write for prices and full details.

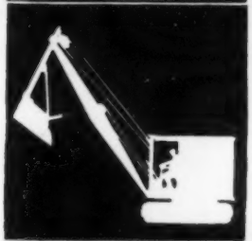
ALLIS-CHALMERS MFG. CO.
Specialists in Power Machinery Since 1846
Monarch Tractors Division
SPRINGFIELD, ILL.
"75"—"50"—"35"

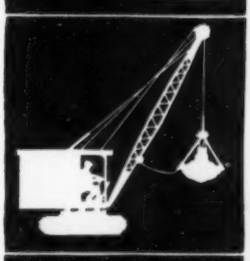


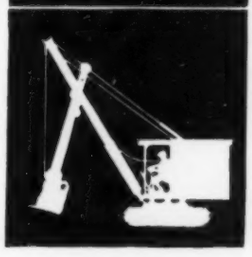
Allis-Chalmers
Monarch Tractors

TRUCK
CRAWLER
LOCOMOTIVE
CRANES









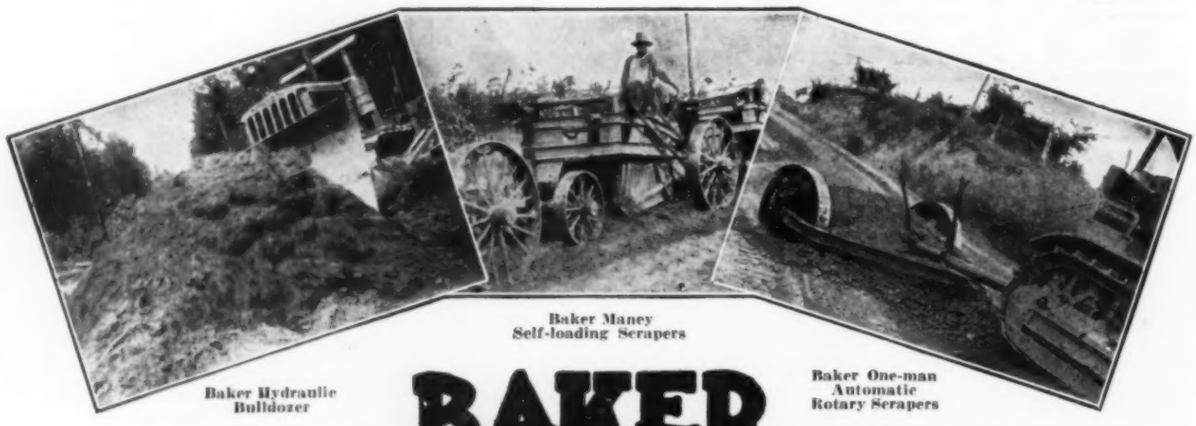
Put a Browning Crawler Crane to work on *any* job . . . see how fast it works, watch how easily it operates, note how smooth it works where the going is tough . . . and then you will understand why you can do more productive work at a lower cost with a Browning.

THE BROWNING CRANE COMPANY
18226 Waterloo Road
CLEVELAND, OHIO, U. S. A.
***Branch Offices:* NEW YORK, N. Y., CHICAGO, ILL.**

DISTRIBUTORS

Portland Los Angeles New Orleans Chicago Montreal Toronto Albany Buffalo Syracuse Boston Minneapolis Birmingham San Francisco Philadelphia Indianapolis Detroit Toledo, Ohio Tacoma Canton, Ohio St. Louis Charlotte, N. C.

BROWNING CRANES



Baker Hydraulic Bulldozer

Baker Maney Self-loading Scrapers

Baker One-man Automatic Rotary Scrapers

BAKER

TRACTOR EQUIPMENT

BAKER BULLDOZERS

Hydraulic Bulldozers with high lift and ability to work below track are made for both Caterpillar and Monarch Tractors. There are also hand-operated Baker Bulldozers and Backfiller for light tractors.

BAKER MANEY SCRAPERS

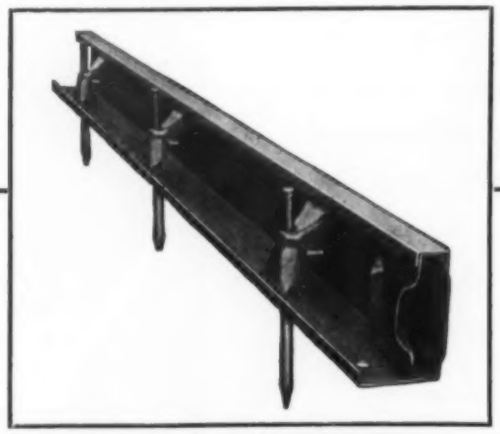
The original self-loading scrapers made in three sizes—¾, 1 and 1½ cu. yds. They dig, load, haul, dump, spread and compact the dirt. Used in trains behind large tractors.

BAKER ROTARY SCRAPERS

One-man automatic Scrapers in four sizes for use with any tractor. No stopping or backing up. Automatic draft control—continuous operation. ideal for short-haul work.

Ask for Special Bulletins—Baker Bulldozers ☐ Baker Maney Scrapers ☐ Baker Rotary Scrapers ☐

THE BAKER MANUFACTURING CO., 568 Stanford Ave., Springfield, Ill.



Heltzel Superior *Lock Type* Road Form.

HELTZEL *Steel Road Forms*

The Heltzel Superior Lock Type Road Form takes curves easier and locks tighter. The lock joint accounts for added ease in negotiating curves. All stakes are individually locked giving greater rigidity and no chance for deflection under load.

These are but a few of the high points featuring this new form. Get all the facts. Write for literature.

We also manufacture steel forms for streets, curb, sidewalk, curb and gutter, manholes, concrete pipe, steel bins, street joint, measuring hoppers, volume and weighing type, bridges, bulkheads, sub grade testers, trail graders, mortar boxes, etc.

The HELTZEL STEEL FORM & IRON CO. Warren Ohio

It will cost you nothing to get the complete story of this modern form.

Name .....

Company .....

Address .....

C.M. 3-30

The Western Rotary Fresno has many unique features giving to the contractor a comparatively inexpensive tool that reduces the cost of grading and finishing.

An Unrivaled Scraper for Short Haul Motorized Dirt Moving

Great strength is outstanding in the Western Rotary Fresno. Notice the ample size of the members subjected to heavy strains.

On work such as leveling and grading property of all kinds, road work, "finishing" larger projects, etc., the Western Rotary Fresno has received enthusiastic endorsement. On this type of work, this sturdy tractor scraper operates so easily, so quickly and so well that the utmost in dirt moving efficiency and economy is achieved.

In the work shown above the loaded pan is just coming to carrying position without effort on the part of the operator. You will notice the smooth cut behind. The depth of the cut can be varied at will. The load may be deposited in one spot or spread in as thin a layer as desired.

Wherever dirt is to be moved short distances the Western Rotary Fresno offers unrivaled operating characteristics.

Write for Bulletin 30-BD.

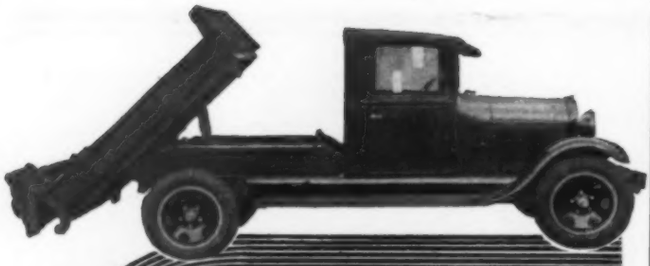
Western Wheeled Scraper Company

Aurora, Illinois, U. S. A.

WESTERN

Western

DUMP CARS AND GRADING EQUIPMENT



GLIDES BACK AND DOWN WHEN DUMPING

HERE'S THE NEW HUGHES-KEENAN POWER GLIDER DUMP

THE Hughes-Keenan Glider Dumps (gravity, hand and power hoist) float back and down when dumping. This glider action eliminates strains and shocks. Makes possible a high dumping angle with unusually low loading height.

The Power Glider Dump is the most remarkable of the three. It's a mechanical power hoist dump for the Ford and Chevrolet Trucks. Its unusually low price, unique design and efficient, fool-proof construction, will wean thousands of contractors from gravity and hand hoist dumps.

This power dump is speedy and sturdy. Will dump full load in about 6 seconds without slightest strain on chassis or body. Hoist is automatically thrown out of action when body returns to loading position.

To see this Power Glider Dump is to realize it was designed and built by men who know dump body construction as Rockefeller knows oil. Mail coupon for new catalog that illustrates it and the entire line of Hughes-Keenan Dump Bodies.

THE HUGHES-KEENAN COMPANY
MANSFIELD, OHIO

Other Hughes-Keenan Products

"Iron Mules", 2 and ½-yard dump bodies mounted on standard tractors. Also Gravity, and Hand Hoist Dumps for standard trucks, and full revolving Roustabout tractor crane.

HUGHES-KEENAN
Steel Dump Bodies

The Hughes-Keenan Company, Mansfield, Ohio

Please send your free illustrated literature checked. "Iron Mule" Folders ☐ Dump Body Catalogs ☐ Ford ☐ Chevrolet ☐ Other Trucks ☐ Crane Folder ☐.

Name .....

Address .....

City ..... State .....

THE TOLEDO TORCH

Hundreds of contractors, state and county Highway Departments and Public Utilities use the TOLEDO Torch because they *know* that as a safety light it has no equal.

Weather won't dim it
Traffic won't upset it
Trucks won't break it
Thieves won't take it

—and our patented Economy Burner saves 50% in fuel cost and eliminates wick consumption.

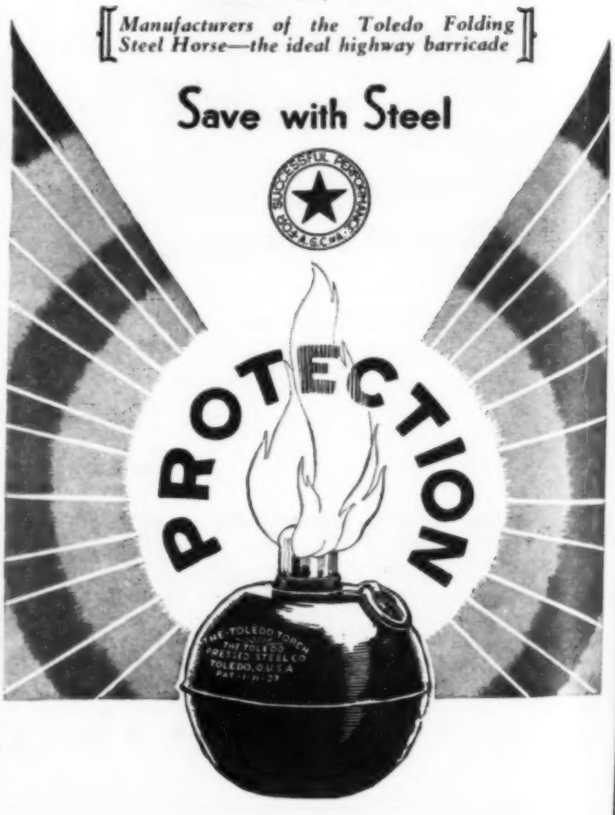
Look for our name on each TOLEDO Torch.

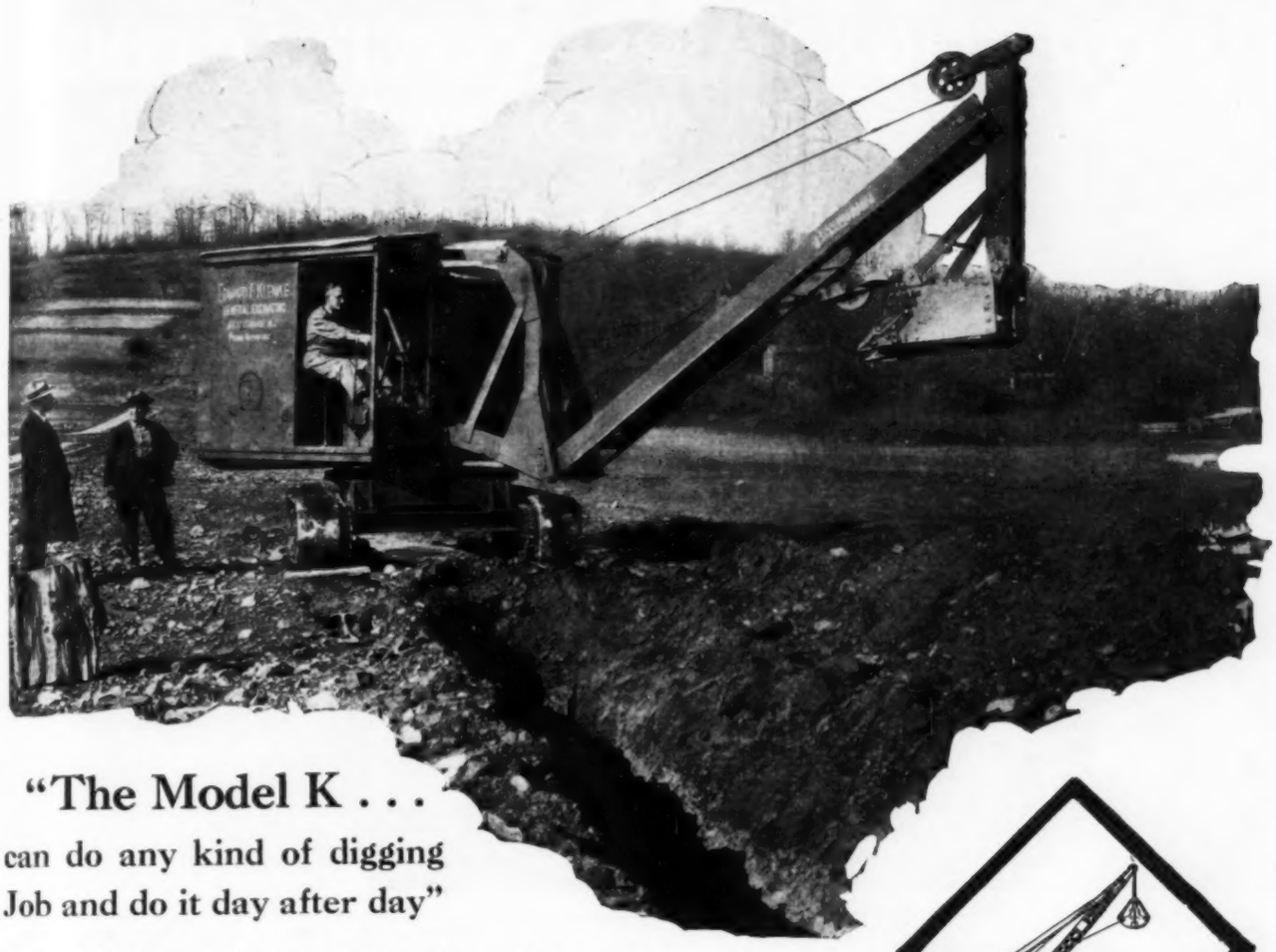
Insist on the genuine TOLEDO Torch.
Your dealer can supply you.

The Toledo Pressed Steel Co.
Toledo, Ohio

Manufacturers of the Toledo Folding Steel Horse—the ideal highway barricade

Save with Steel





"The Model K . . .

can do any kind of digging Job and do it day after day"

SO SAYS Edward F. Klenke of West Orange, N. J., proud owner of a BAY CITY with a trench-hoe attachment. This machine has been digging pipe line trench for the Public Service Corp. of N. J. in the Orange Mountain District.

He goes on to say, "an exceptional test for a shovel . . . the material was hard to dig . . . shale . . . stones . . . good sized boulders . . . On this job my machine dug 812 feet of trench 4 ft. deep in 6½ hours . . . very economical . . . uses only about 12 gallons of gas in 9 hours . . . very easy on cables . . . I have had other machines . . . my next will be another 'Model K.'"

And why not? The BAY CITY Model K is a sturdy, rugged, compact piece of equipment, ready to stand up under the most grueling tests . . . it's built that way. 14½ tons; convertible to shovel, crane, skimmer, dragline, trencher or backfiller; Extra wide Slewing circle and Roller path; 8-inch center pin; hoist line speed—150 feet per minute; equipped with Roller or Ball Bearings; short tail swing and many other features.

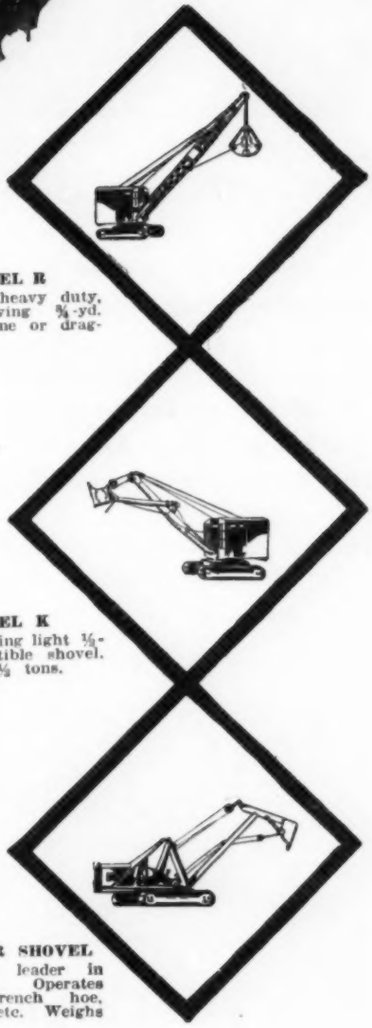
Just the kind of machine to put on your job. It will make money for you as it has for many others. Now is the time to investigate—write for further details or ask for demonstration by our nearest distributor.

BAY CITY SHOVELS, Inc.

New York Office—302 Broadway BAY CITY, MICH.

BAY-CITY

The BAY CITY family of fast workers



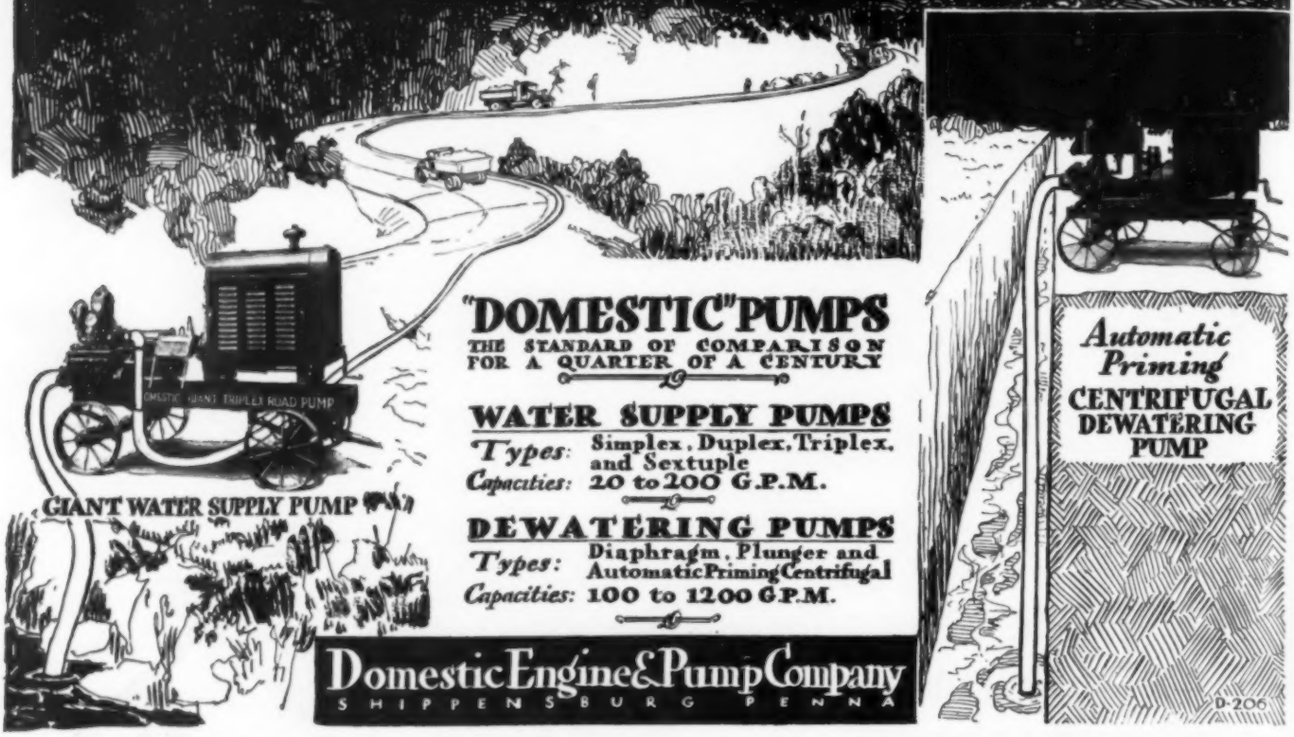
MODEL B
A 20-ton, heavy duty, full revolving ¾-yd. shovel, crane or dragline.

MODEL K
Full revolving light ½-yd. convertible shovel. Weighs 14½ tons.

TRACTOR SHOVEL
Recognized leader in its field. Operates shovel, Trench hoe, backfiller, etc. Weighs 10 tons.

"DOMESTIC" PUMPS *for* CONTRACTORS

Their Use Means SAFETY SPEED *and* PROFITS


GIANT WATER SUPPLY PUMP
"DOMESTIC" PUMPS
THE STANDARD OF COMPARISON FOR A QUARTER OF A CENTURY
WATER SUPPLY PUMPS
Types: Simplex, Duplex, Triplex, and Sextuple
Capacities: 20 to 200 G.P.M.
DEWATERING PUMPS
Types: Diaphragm, Plunger and Automatic Priming Centrifugal
Capacities: 100 to 1200 G.P.M.
Automatic Priming CENTRIFUGAL DEWATERING PUMP
D-206
Domestic Engine & Pump Company
SHIPPENSBURG PENNA

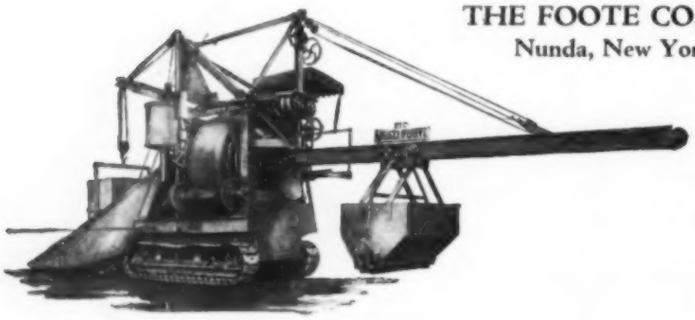
Performance—Profits

Greater Speed—Greater Reliability—
Fast, Steep Discharge—Tried, Proven

The Record of the MultiFoote Paver for years assures you of that steady, daily performance which means Speed and Profits. The 1930 Improvements automatically save you every possible minute.

TIMKEN BEARINGS NO-PRESSURE WATER TANK
HERCULES HEAVY DUTY GASOLINE MOTORS

THE 1930 MULTI FOOTE PAVER



THE FOOTE CO., Inc.
Nunda, New York

for Speed-Service-Success

GENERAL DISTRIBUTORS

THE HUBBARD-FLOYD CO., 167th St. & Sedgwick Ave., New York City
THE MULTIFOOTE SALES CO., 2811 W. Fulton St., Chicago, Illinois
WILCOX BROS., 588 Chenango St., Binghamton, N. Y.
E. J. McHARG & CO., 31 Crestmont Road, Binghamton, N. Y.
BURTON FRANKLIN CO., Manufacturers' Rd., Chattanooga, Tenn.
EDWARD R. BACON CO., Folsom St. at 17th St., San Francisco, Calif.
CLYDE EQUIPMENT CO., 555 Thurman St., Portland, Oregon
THE C. H. JONES CO., 134 Piermont Ave., Salt Lake City, Utah
LONDON CONCRETE MACHINERY CO., London, Ontario, Canada

World's Largest Exclusive Builders of Road Pavers

This Complete Proven Line
Meets Every Heavy Hauling Need

The Rogers *and only the Rogers* provides a full range of models that meets every heavy hauling requirement, and conforms to practically all local ordinances and restrictions.

Rogers Brothers were first to rate trailer capacities according to the capacities guaranteed by tire manufacturers, and to use this principle exclusively. All ratings are, therefore, absolutely accurate and dependable.

The distinctive Rogers features of the gooseneck, exceptionally rugged type of frame construction and full turn fifth wheel are retained throughout the entire range of sizes.

4 Wheel Trailers Four-wheel Trailers in 5, 10 and 15-ton capacities supply units capable of meeting all needs of lighter miscellaneous hauling, either as full trailer with truck or industrial tractor, or, without front unit, as semi-trailer with tractor truck or platform truck.

6 Wheel Trailers This, a very popular type, is equipped with two wheels in front carrying two or four tires, and four wheels on two oscillating axles in the rear which may be equipped with eight tires if desired. Standard capacities are 15, 20, 28, 35 and 45 tons.

The 28-ton Trailer may be built as narrow as 8 feet, and larger sizes proportionately narrow.

8 Wheel Trailers These models have four wheels on two rocking axles, both at front and rear. They may be equipped with as many as 12 tires. Made in 28, 31, 35 and 45-ton sizes with a 10-foot overall width.

12 Wheel Trailers This Herculean model, with 8 wheels at the rear on double rocking axles is built to handle tremendous weight with the load evenly distributed at all times over from 12 to 20 tires. It is the only trailer made with brakes applying on all 8 rear wheels. Available in standard sizes from 35 to 80 tons and built to order in larger capacities up to 100 tons.

ROGERS BROTHERS CORPORATION
106 Orchard St.
Albion-Penna.

ROGERS
World's Standard
HEAVY DUTY
TRAILERS

Girder Type Trailers

This model, with underslung girders gives the very minimum loading height for localities where low bridges are encountered. The shovel straddles girders, increasing height of load only a few inches. Standard models as narrow as 7 ft., 9 in. overall with as much as 116 in. of rubber.

Solve Your Problem
Send for Rogers Catalog Today

It handles like a 7S.... but it holds 2 Bags

Jaeger Gains 50% Extra Strength...Throws Off 1000 Lbs. Dead Load to Build this Faster, more Portable 10S Mixer

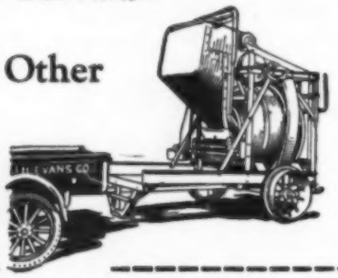
- Built of steel
- Short coupled, direct driven
- 100% ball bearing
- Machined steel tracks
- Chilled ground faced rollers
- Big drum openings
- One man control
- Automatic Skip Shaker
- Fast accurate measure water tank
- Spring hung chassis
- Dual tire wheels, roller bearings
- Minimum wear and power consumption

10S 2-Bag Size

Other Non-Tilters in 7, 14, 21, 28 ft. Sizes.
Tilters 3½, 5, 7, 10, 14 ft.
Pumps—all sizes and types.

Outselling all Other 7S Mixers

Sensational one-bag Speed King trailer with end discharge—low charge or loader type. Write for special price.



THE JAEGER MACHINE CO
800 Dublin Ave., Columbus, O.

Date_____

Send catalog, prices and terms on

☐ Non-Tilters 7, 10, 14, 21, 28 ft. ☐ Plaster Mixers 1 and 2 Bag ☐ Tilters 3½, 5, 7, 10, 14 ft.

☐ Contractors Pumps—Towers—Hoists

(Check where interested)

Name_____

Address_____

Showing Curcrete being applied on Division Road, Royal Oak, Michigan

Cured 10 million square yards in 1929

Curcrete *proved* that it is the most effective process for curing concrete. In 1929, street contractors and road builders in 28 states used Curcrete on 10 million square yards of concrete paving—more than 100 times the surface upon which it was used in 1928.

Both city streets and rural highways have been cured by this convenient and economical process which dispenses with sprinkling with water, covering with burlap, hay, earth or chemicals.

Curcrete is an asphalt-emulsion manufactured especially for curing concrete. It is applied by means of a pressure spray to the surface of the concrete soon after finishing and while the concrete still is soft. When applied from a mechanically operated bridge, but one man is required to cure from 1000 to 1500 running feet of 20 ft. wide pavement per day.

The sufficiency and thoroughness of a Curcrete application are visible and no further attention is required by either contractor or inspector.

Let us send you the Curcrete booklet which gives the results of tests and complete information about Curcrete.

THE BARBER ASPHALT COMPANY

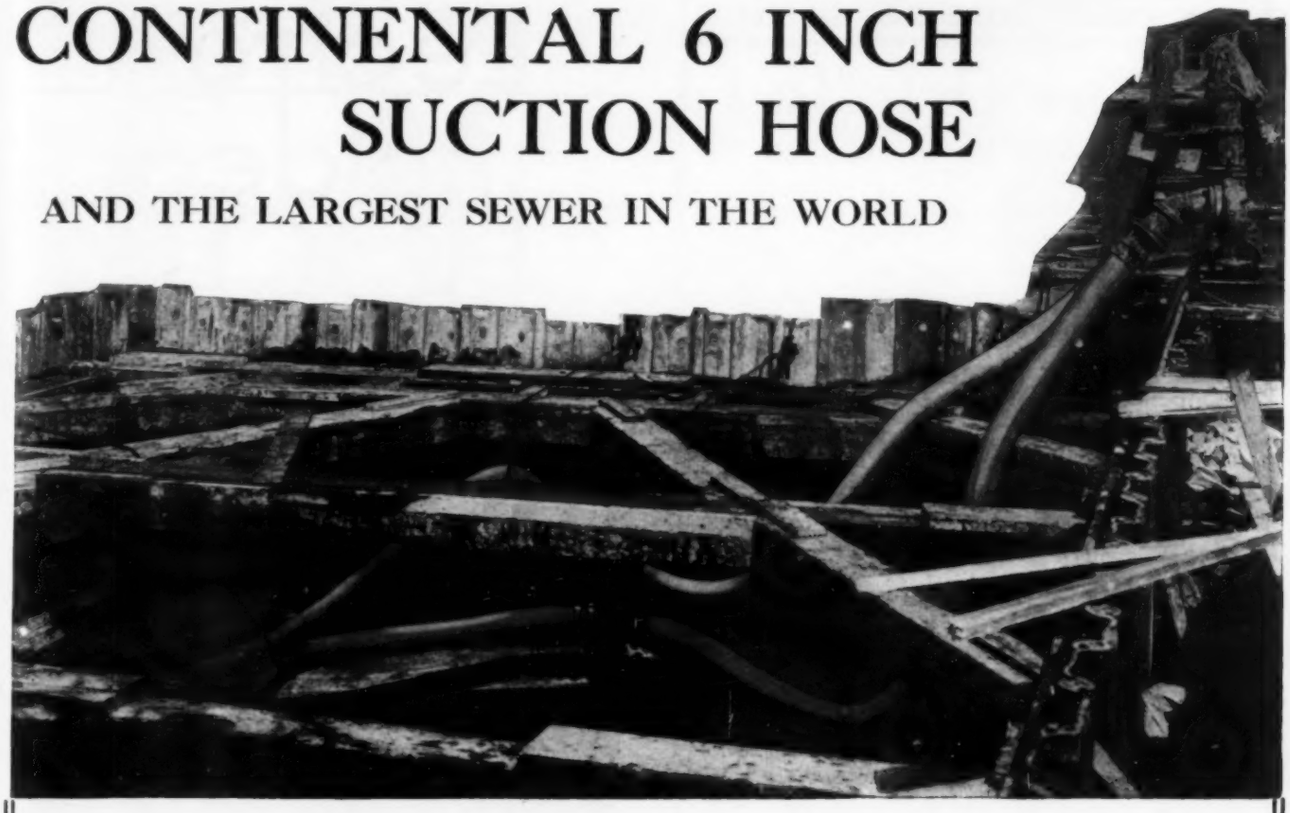
New York Pittsburgh PHILADELPHIA St. Louis Chicago Kansas City San Francisco

"Curcrete" (trade-mark registered) is sold for use in the curing of concrete by the "Curcrete" method (U. S. Patents, 1,539,763 and 1,684,671, and foreign patents pending) controlled by The Barber Asphalt Company. The Barber Asphalt Company grants to the purchasers of "Curcrete" the right and license to practice the "Curcrete" method of curing concrete, controlled by it, in connection with the use of "Curcrete" produced by it, and the purchasers by accepting "Curcrete" accept the license and acknowledge the company's rights in connection with the "Curcrete" method.

CURCRETE

CONTINENTAL 6 INCH SUCTION HOSE

AND THE LARGEST SEWER IN THE WORLD



Smooth Bore

NATURALLY, when the Detroit Drainage Construction Company tackled the Conners Creek Sewer which is one of the very largest sewer construction jobs in the country,—they specified CONTINENTAL SUCTION HOSE.

Continental Steam, Air, Welding, Air Compressor, Water and other Hose constructions are used with equal satisfaction by contractors throughout the country.

GIVE US A CHANCE ! ! !

Specify Continental and Get the Benefit of the Best.

Rough Bore

Write Our Nearest Branch for Prices and Information:—

BALTIMORE, MD	112 W. Pratt St.	**DETROIT, MICH.**	5423 12th St.
BOSTON, MASS	200 Congress St.	**MILWAUKEE, WIS.**	6122 Parkhill Ave.
BUFFALO, N. Y.	885 Niagara St.	**NEW YORK, N. Y.**	152 Chambers St.
CHICAGO, ILL.	27 West Illinois St.	**PHILADELPHIA, PA**	313-319 New St.
CLEVELAND, O.	203 Perry Payne Bldg.	**PITTSBURGH, PA.**	300 Penn Ave.
DAYTON, O.	122 So. St. Clair St.	**ST. LOUIS, MO.**	221-223 No. 3rd St.
	TOLEDO, OHIO 415 Michigan St.		

Continental Rubber Works, Erie, Pa.

CHAS. C. KERNER, 152 Chambers Street, New York, Exclusive Foreign Representative

THE RIGHT TOOL SAVES TIME

. . For Grading

Here is the finest time and labor saving tool ever designed for light ditching, leveling up the roadbed or other excavations, trimming and grading shoulders. One man with this tool does nearly as much as two men with pick and shovel.

Workmen like the True Temper Grading Hoe because it is perfectly hung, swings easier than a pick, and does more work with less effort.

Blade and eye forged from one piece of high carbon steel, oil tempered. Three and one-half foot selected hickory handle, oval shaped to fit the hand. Blade is 7 inches wide and 7¼ inches deep.

The brand True Temper is burned in the handle to mark each hoe as the best tool of its kind that can be made.

THE AMERICAN FORK & HOE COMPANY
1901 Keith Building
Cleveland, Ohio

Makers of Farm and Garden Tools for over 100 years.

Branded on the handle of every genuine TRUE TEMPER *tool*

If your dealer has not yet stocked the Grading Hoe, Cat. No. IGH7, send us his name and $2.10 and we will supply you direct; postpaid.

FREE *on request*
Heavy Steel Goods or Industrial Tool Catalog. Describes over 50 tools for mill, mine, factory and coal yard.

TRUE TEMPER TOOLS

Lectro molded BOOT

Here is a new and better type of Rubber Boot . . .

Molded in one piece like an automobile tire

STORM KING HEIGHT

SHORT HEIGHT

Have you seen the newest development in rubber boots—the Lectro *Molded* Boot? Built by an entirely new method—completely molded in one piece under terrific pressure, making the rubber so compact and tough that it will wear like steel. It will withstand grinding and cutting that soon wrecks a pair of ordinary boots.

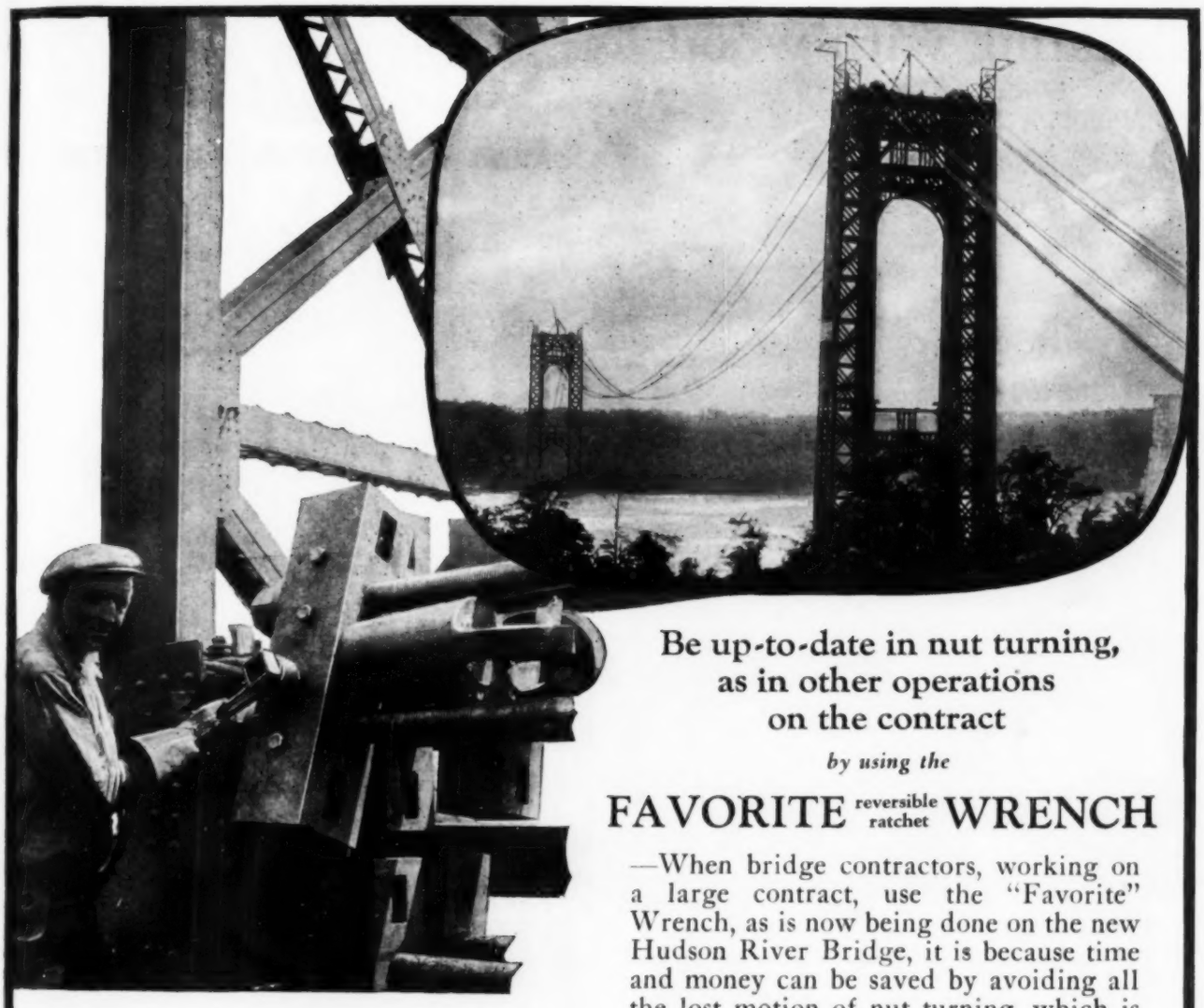
Lectro Molded Boots are patented and are manufactured only by the Hood Rubber Company, Inc., who also make a complete quality line of protective rubber footwear for all industrial uses.

If your supply house cannot supply you with Lectro Molded Boots, write to Hood Rubber Co., Inc., Watertown, Mass. Without any obligation whatever, we will be pleased to send you a folder which describes fully the unusual construction of this new product.

MOLDED BOOT · HOOD RUBBER COMPANY · LECTRO BRAND · WATERTOWN, MASS.

HOOD RUBBER COMPANY, INC.
Watertown, Massachusetts

HOOD MAKES CANVAS SHOES · RUBBER FOOTWEAR · TIRES
RUBBER SOLES & HEELS · RUBBER FLOOR TILING



"Favorite" Wrench used on piers of new Hudson River Bridge at 176th St., New York City, being built by Port of New York Authority; cables constructed by John A. Roebling Sons Co.

Be up-to-date in nut turning, as in other operations on the contract

by using the

FAVORITE reversible ratchet WRENCH

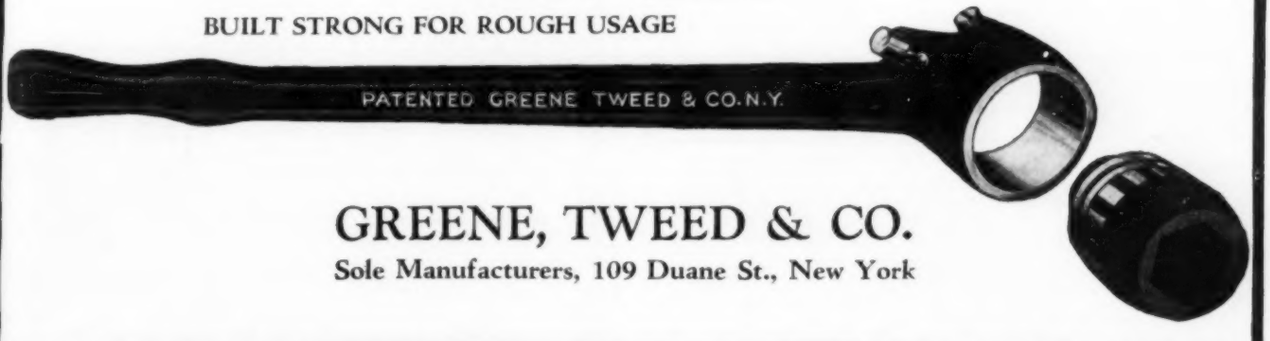
—When bridge contractors, working on a large contract, use the "Favorite" Wrench, as is now being done on the new Hudson River Bridge, it is because time and money can be saved by avoiding all the lost motion of nut turning, which is unavoidable with the old-fashioned open end wrench.

The "Favorite" Wrench works with a quick ratchet movement, and does not leave the nut until operation is completed. Has the socket form of head that bears on all sides of nut and so avoids slipping.

THE "FAVORITE" WRENCH IS IN EVERY SENSE A TIME-SAVING TOOL

Send for full particulars.

BUILT STRONG FOR ROUGH USAGE



GREENE, TWEED & CO.

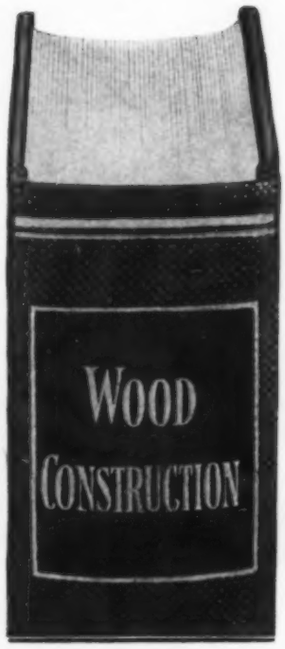
Sole Manufacturers, 109 Duane St., New York

Building with wood:

—to eliminate waste;

—for greater efficiency in construction;

—to get a larger return on the lumber dollar.



Wood Construction

A Report of the National Committee on Wood Utilization

By DUDLEY F. HOLTMAN

707 pages, 6x9 inches, $6.00 postpaid.

THE aim throughout has been to give basic information that will aid the user in designing and specifying wood construction and to aid in the efficient selection and application of the material and in the adoption of efficient and economical forms of design.

One of the features of the work is a simple unified system of grading lumber, recently adopted, which can be applied to give the wood user the kind of material which will serve his particular purpose efficiently and economically.

The book contains several hundred diagrams, drawings and tables, among which are specially drawn architectural plates illustrating actual wood-building operations.

Subjects covered in this book:

The first seven chapters of Wood Construction include information on the factors affecting the use of wood in construction; lumber grading, grade provisions, and working stresses; the principal woods used in building and construction; the identification of common woods; preservative treatment; the use of paints and stains, and methods of preventing termite damage. The last four chapters contain information on approved methods of using lumber in light building construction and mill-work, and in both heavy timber and temporary construction.

In an appendix are given compilations showing the standard grades produced in the various species, and tables of the lumber grades used for various construction purposes.

We will be glad to send you a copy for FREE EXAMINATION

Fill out and mail the coupon below. We will send you a copy of this book. Keep it for 10 days without cost or obligation. Look it over thoroughly. Then decide whether or not you will buy it.

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York

Please send me a copy of Holtman's WOOD CONSTRUCTION, $6.00 postpaid, for 10 days' free examination. I agree to remit for the book or return it after 10 days.

Name .....

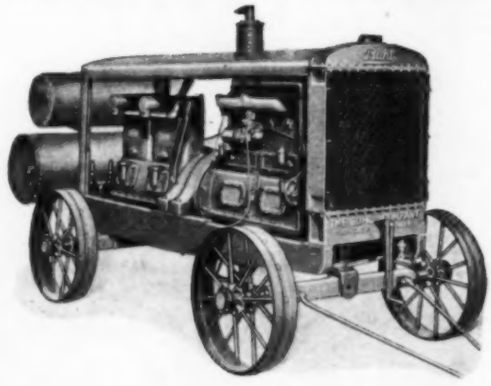
Home Address .....

City ..... State .....

Position .....

Name of Company C.M.3-30

THE
Buhl
HAS NO VALVE TROUBLE



THE special patented BUHL Dual Valves insure continuous operation without shutdowns because of valve trouble.

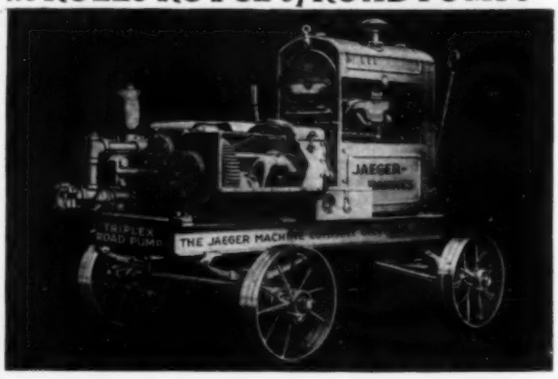
And this unusual and highly desirable feature is but one of many reasons why the BUHL is preferred by leading contractors everywhere.

Other outstanding features of the BUHL are: forced feed lubrication, specially designed clutch, and interchangeability of parts.

Please Write for Descriptive Literature

The *Buhl* Company
Old Colony Building, CHICAGO

The ROLLS-ROYCE of ROAD PUMPS



NO WATER FAILURE with this DEPENDABLE JAEGER-BARNES . . . .

TESTED and proven on a thousand road jobs...backed by quick service from over 100 cities...the last word in pump building for contractors who know what idle crews and pavers cost.

Send for prices and catalog fully describing this Triplex Road Pump.

SPEED BOY Centrifugal $167.50 complete!

Self-priming centrifugals and all other pump types and sizes.

THE JAEGER MACHINE CO.
800 DUBLIN AVE., COLUMBUS, OHIO

On the Job with the B&A RAILROAD

Here's a job the New England Construction Company of Springfield, Mass., were doing for the Boston & Albany Railroad near Worcester. HEAVY TIMBER TO BE BOLTED—SPEED NEEDED. You just bet Lowells were rushed onto the Job!

Railroad Bridge and Building Supervisors everywhere insist on these tools for typical jobs. Can we help you with yours?

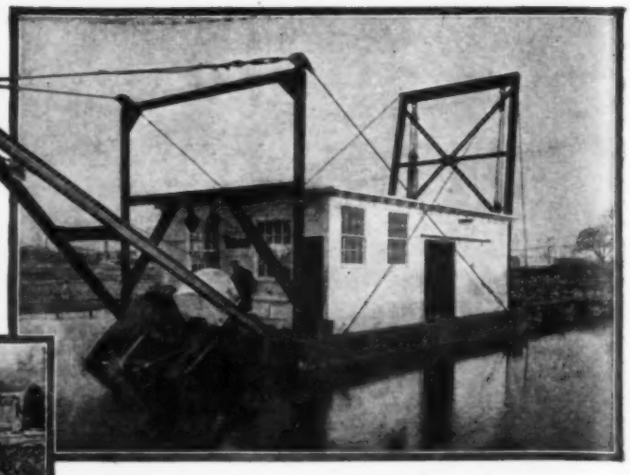
Send for our complete Catalog R showing the whole line of big, and little Lowell Reversibles, any of which you might need at most any time.

Don't forget the Catalog R!

LOWELL REVERSIBLE RATCHET WRENCHES

LOWELL WRENCH CO.
WORCESTER, MASS.

Portable Dredges



A Morris Portable Dredge permits serving a great variety of operations at widely separated localities between which there may be no means of transportation by water.

When the sand and gravel producer has exhausted the material at one location, or when the general contractor has completed one dredging and filling job, their Morris Portable Dredges can readily be dismounted, transported over the shortest route to the next development work and there reassembled for further use.

This important feature, together with the many special advantages of Morris Dredging Pump construction, make an investment in Morris Equipment pay large dividends in maximum flexibility of service, speedy production, and economical operation and maintenance.

Send for Bulletins.

MORRIS
CENTRIFUGAL PUMPS

Morris Machine Works, Baldwinsville, N. Y.

Fultex
Waterproofed
TARPAULINS & TENTS

Protection against weather-damage at low cost. **"FULTEX"** Khaki Waterproofed tents, tarpaulins and windbreaks—serviceable for every purpose—quality at moderate price. Burlap—in bale or made-up covers—for protecting green concrete.

Makers of famous **"SHUREDRY"**, **"DFMP"**, **"USAMP"**.

Get in touch with your nearest dealer. If he cannot supply you with **"FULTEX"**, write us.

Manufacturers Since 1870

FULTON BAG & COTTON MILLS
ATLANTA · BROOKLYN · DALLAS · ST. LOUIS
MINNEAPOLIS · NEW ORLEANS · KANSAS CITY KAN.

A Sensational Performer and Money Saver

THE speed, versatility, rugged construction, big yardage and low cost of the Fundom combination shovel, ditcher and crane, make it a sensational performer and money saver.

It makes small jobs profitable. Fast, full ¾ circle swing, 1/3 yard dipper capacity, 16½ foot radius, gasoline power.

With Trench Hoe attachment for ditching or Boom Extension for clamshell, dragline or crane, the Fundom is an unbeatable three-in-one digging machine.

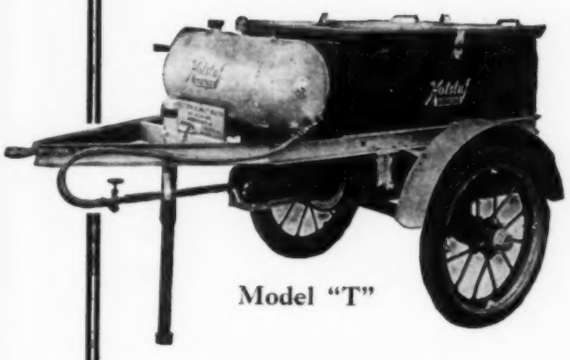
Get the details and name of nearest dealer. Address—

The Fundom Hoist & Shovel Co.
314 Central Building, Lima, Ohio

Hotstuf

TRADE MARK REG

"The Best We Know of...."



Model "T"

This is the unsolicited and enthusiastic endorsement of HOTSTUF Heaters by a nationally known manufacturer.* A concern that has tested, experimented and used all kinds and all makes of asphalt heaters. HOTSTUF Equipment is not only designed for the maximum of efficient service but to do more and better work for less.

HOTSTUF Heaters are recognized as the Master Oil Burning Asphalt Heaters. Our patented elevated melting chamber provides for EIGHT distinct and profitable advantages. It's these features that have made HOTSTUF Heaters the preferred equipment with all construction companies, road and street contractors, roofers, public utilities and everybody employing good heaters in their work.

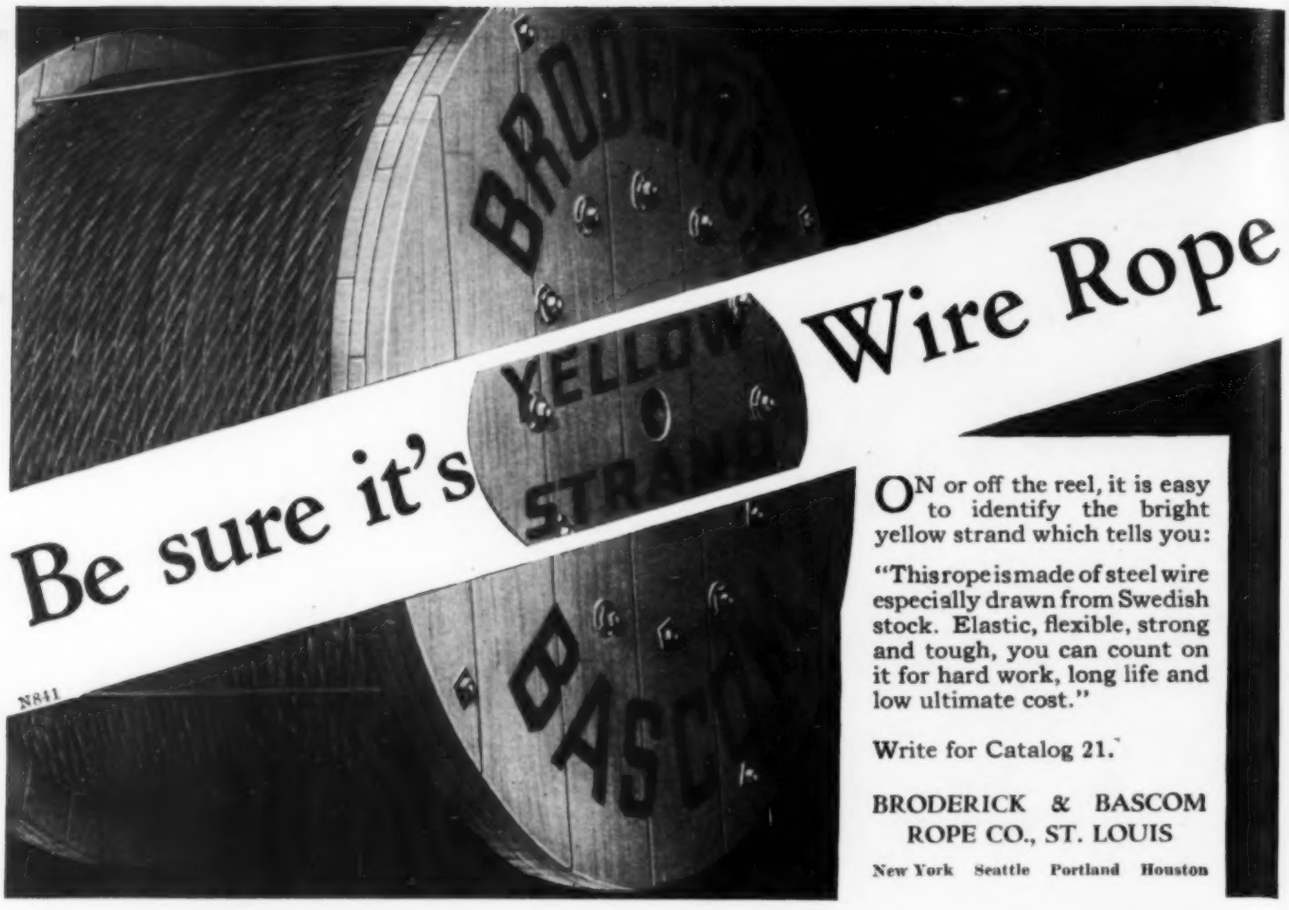
The MOHAWK HI-SPEED TRAILER is the last word in modern equipment for the progressive contractor. No more stolen tools, no more lifting or lugging with this valuable and profitable Tool Box.

Write TODAY for Bulletin No. 12. It tells an interesting and convincing story about HOTSTUF Equipment.

**We will gladly send you the names of satisfied owners in your locality.*

MOHAWK ASPHALT HEATER COMPANY

62 Weaver St., Schenectady, New York



Be sure it's Wire Rope

ON or off the reel, it is easy to identify the bright yellow strand which tells you:

"This rope is made of steel wire especially drawn from Swedish stock. Elastic, flexible, strong and tough, you can count on it for hard work, long life and low ultimate cost."

Write for Catalog 21.

BRODERICK & BASCOM ROPE CO., ST. LOUIS

New York Seattle Portland Houston

When the Job is Tough
you can rely on the
"GROUNDHOG"
Revolving Tractor Scraper
for

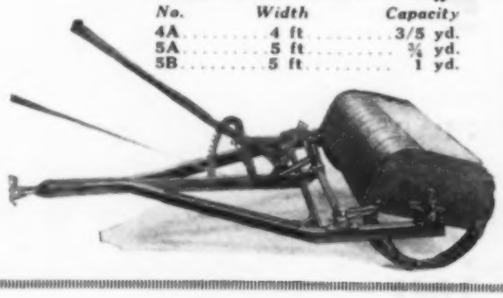
Road Grading—Municipal Air Port Construction — Golf Course Building — Real Estate Developments — Excavating Work — Parks — Fills — and General Leveling Operations.

Works fast—the depth of cut is always under control—loads and spreads—or dumps, under forward draft. The ideal equipment for the busy contractor.

THE RODERICK LEAN CO.
Dept. CM; MANSFIELD, OHIO

Built to Stand the Gaff

No.	*Width*	*Capacity*
4A	4 ft	3/5 yd.
5A	5 ft	¾ yd.
5B	5 ft	1 yd.



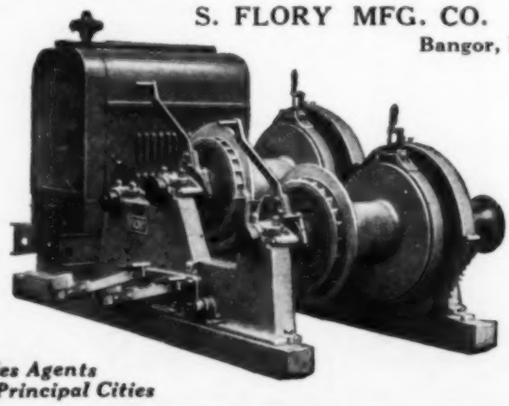
FLORY

Announcing the New

"FLOR-OX"15-25
CONTRACTORS' HOIST

This NEW "FLOR-OX" is marked by smoothness of operation, utmost dependability and extreme ruggedness of construction. It has the same outstanding features as the "FLOR-OX" 35-50.

S. FLORY MFG. CO.
Bangor, Pa.



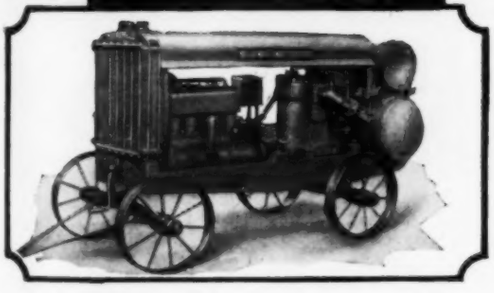
Sales Agents in Principal Cities

FACTS ON AIR KINGS

CONTRACTORS!
It's to your advantage to know

that when we claim the *"AIR KING"* to be the FINEST Portable Compressor, actual FACTS *BACK UP THIS STATEMENT.*

IN NO OTHER MAKE OF COMPRESSOR CAN ALL OF THE FOLLOWING FEATURES BE OBTAINED:



(1) Worthington Laidlaw Feather Valves.
(2) Full Forced Feed Lubrication throughout engine and compressor.
(3) Extra heavy crankshafts carefully counterbalanced.
(4) Four Ring Pistons.
(5) Patented all steel frame guaranteed for the life of the machine.
(6) Compressor cylinders water jacketed their entire length.
(7) Compressors driven through patented quick detachable flexible coupling.
(8) Super Energy Robert Bosch Magneto.
(9) Sectional Radiators.

And don't forget that behind this compressor stand the reputation and research resources of the Worthington Pump & Machinery Co., who have been building machinery for the past 85 years.

Every mechanical feature has well proven its worth. There are no "experiments" in the *"AIR KING."*
Drop us a line, asking for our illustrated book "Portable Air Compressor." You will find it very interesting.

METALWELD — WORTHINGTON
AIR KING
Portable Air Compressors

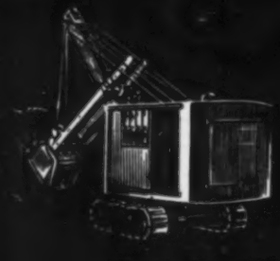
METALWELD, INC., 26TH AND HUNTING PARK AVE., PHILADELPHIA
Dealers in Principal Cities

METALWELD-WORTHINGTON
PORTABLE AIR COMPRESSORS

The
GOPHER

The Quality
Engineered
Shovel
Crane

All-steel
Light Weight
Greater
Stability
because
Low Center
of Gravity



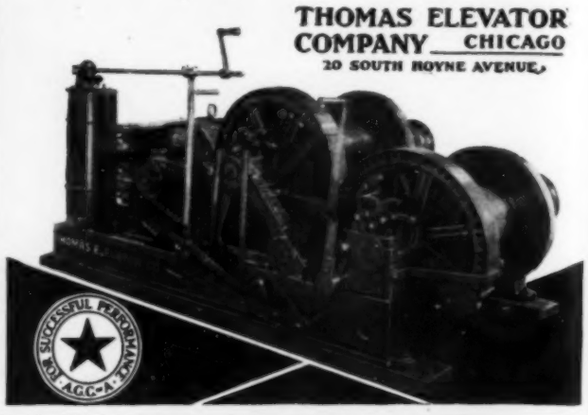
Quality Engineering

AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minnesota

THOMAS HOISTS

The first cost is the last cost. . .
Dependable . Reliable . Safe . Fast.
Equipped with Thomas Band Frictions and Automatic Motor Brakes.
The finest Hoists are built by Thomas.

THOMAS ELEVATOR COMPANY CHICAGO
20 SOUTH ROYNE AVENUE

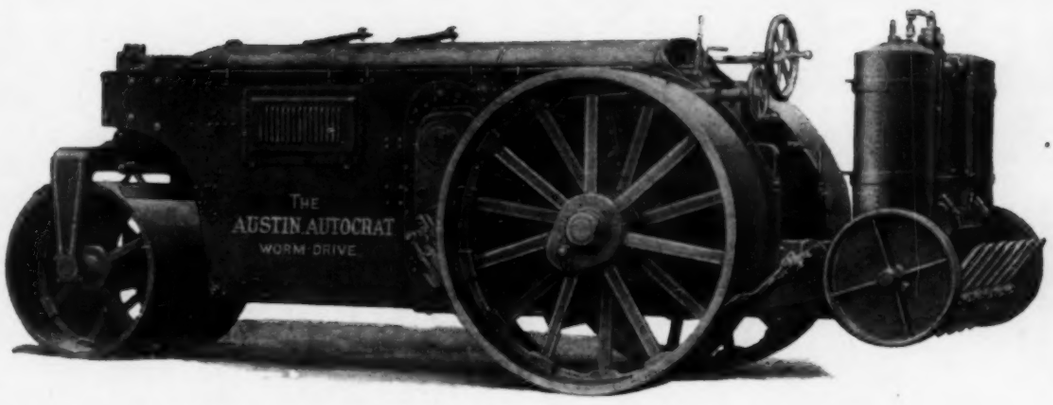


With a WAPPAT Handsaw

on the job you will gain time. At the same time cut costs. These saws pay for themselves, then pay dividends.

WAPPAT INCORPORATED
Division of Simonds Saw and Steel Co.

44 Braddock Ave.
Pittsburgh, Pa.



The Austin Autocrat Roller equipped with pneumatic scarifier

Performance, power and easy handling

such as you've never known in any other roller

Austin Autocrat is the only roller with DUPLEX WORM DRIVE. Also has electric starter—enclosed differential—three speeds forward and reverse

A worm drive is an entirely new application as far as road rollers are concerned, usually being used only in the best and most expensive motor trucks and machine tools.

The Duplex Worm Gear Drive by which the power of the modern four cylinder motor is transmitted to the clutches and rear axle makes the Autocrat the outstanding road roller of today. The immediate and practical results of this feature are at once apparent from the operating viewpoint.

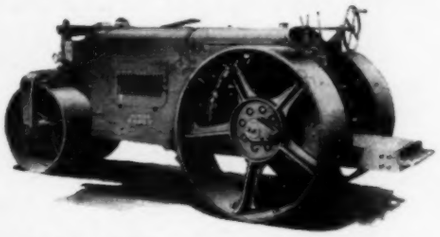
It transmits more power, makes possible more immediate speed reduction, does not require expert attention, is foolproof, and is silent in operation and entirely free from vibration.

Twin-Disc clutches, fourteen inches in diameter control forward and reverse movements of the roller and operate by a single lever. There are three transmission speeds, both forward and reverse. An electric self-starter that operates from the control panel and an enclosed differential gear are also regular equipment.

Oil and gasoline gauges and all controls are mounted on a panel directly in front of the operator.

A powerful pneumatic scarifier of improved design and construction may be ordered extra.

The pleasing streamline design, deep side plates and heavy rattle-proof construction are not the least of the Autocrat's attractive features. Made in 10 and 12-ton sizes. The most significant fact about the Austin Autocrat is the profound effect it has had on *all* roller design—superficially at least! The Austin-Western Road Machinery Co., 400 North Michigan Ave., Chicago, Ill. Branches in principal cities.



The Austin Cadet—the Autocrat of Pup Rollers

Watch this pup!

Put an Austin Cadet on the job and watch it go after work like a terrier worrying a bone! Between forms on a concrete road. Leveling subgrades. Scarifying. Doing the trick on all kinds of jobs and right at home in places too tight for big rollers.

The Austin Cadet is a real roller—patterned after the Austin Autocrat, peer of them all. Streamline; three speeds forward and three reverse; four cylinder Buda motor, cranked from either side; enclosed transmission; gears running in oil; 5, 6, and 7-ton sizes. Scarifier and other special equipment optional.

Austin-Western
ROAD MACHINERY

TRUSCON STEEL DOORS

Built To Withstand Hard Punishment

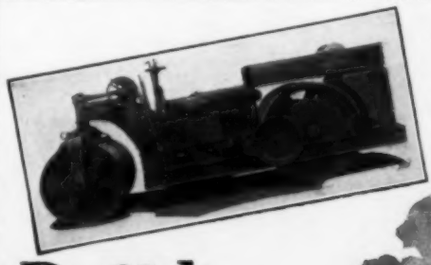
Truscon Steel Doors are built to last—built to withstand the hardest punishment to which doors can be subjected. These high quality, sturdy doors provide the best protection for industrial buildings, garages, hangars, service entrances, etc. Furnished in standard types, Slide, Swing, Lift, Folding, Lift-Swing and Hangar, or of special design to meet individual requirements, Truscon provides the last word in door permanence, ease of operation and quality. Write for catalog and prices.

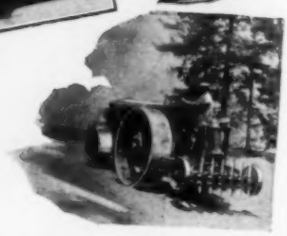
TRUSCON STEEL COMPANY
YOUNGSTOWN, OHIO
(Steel Door Division)
Truscon Steel Company of Canada, Limited,
Walkerville, Ontario
Warehouses and Offices in Principal Cities

Standard Single Swing Type Steel Door

Standard Double Slide Type Steel Doors

A PRODUCT OF TRUSCON





Buffalo-Springfield ROLLERS

The wide spread adoption of Buffalo-Springfield Rollers can mean only one thing—that the builders of our roads and streets consider them the most practical and the most dependable rollers on the market. It is the old adage, "values will tell" reasserting itself.

All practical sizes, both steam and motor driven. Scarifiers and other special attachments when desired.

When in the market, investigate the Buffalo-Springfield. Write for illustrated booklet describing the entire line.

The Buffalo-Springfield Roller Co.
Springfield, Ohio

Will last a lifetime

The F. P. M. Pencil Pointer
—Does the trick!

Draftsmen, Designers, Engineers and **Architects** will find this attractive and practical machine the most convenient method of pointing leads of drawing pencils. Is operated with one hand only—can be kept on the board within easy reach—will not soil hands, paper or drawings and will keep point of pencil clean.

Will last a life time—abrasive surface of 16 square inches can readily be renewed.

ONLY $1.50 Postpaid

Established 1885

KOLESCH & COMPANY
Sole Distributors
138 Fulton Street, NEW YORK, N. Y.

ORTON Model 15 Crane and Shovel

A completely convertible 1½-yard crane, shovel, dragline and ditcher built for the heaviest excavating and material handling.

Alloy steel shafts and gears with electric welded base combine to make it the most modern high-speed excavating machine on the market.

Four-speed, heavy, automotive-type transmission, with gears constantly in mesh.

Operator's position clear out in front.

Unit-structure base completely electric-welded.

KENMORE 5000
KENMORE 0934

THE A. J. PENOTE COMPANY
UNDERGROUND CONDUIT AND CABLE SYSTEMS
WATER, GAS AND STEAM MAINS
SEWERS, CONNECTIONS
20100 ST. CLAIR AVE.
CLEVELAND, O.

February 17th, 1930.

Mr. Thomas F. Moore,
President,
Moore Trench Machine Company,
Rockaway, New Jersey.

Dear Mr. Moore:-

I cannot refrain from telling you of the wonderful success we had with your well points at Chesterton, Indiana during the past year.

We started this job with well points commonly used in this locality, without success. It was very discouraging until I remembered seeing one of your advertisements and immediately placed an order and upon installing them, presto, a dry hole.

We found that one of your well points was equal to five of the ordinary well points and besides it was much easier to get your points down.

I would recommend your points to any Contractor who was work of this nature.

With best wishes, I am

Very truly yours,

The A. J. PENOTE COMPANY.

A.J.Penote

AJP/wl

One . . . Worth Five

This testimonial reminds us of a chap from Niobrara.

Out thar . . . where men are men, a husky youngster lived. One of those "up and at 'em" chaps. He could wallop any three men in town before he was twenty. When the election board received his first vote he passed in two more. "No foolin'." After that they called him the Niobrara Triplet.

Mr. Penote says that one Moretrench Wellpoint is *better than five* ordinary *points. And they go in easier.*

Hire a good man whenever you can.

Moore Trench Machine Co.
Rockaway, New Jersey

Buy Your

Stillson Wrenches

and all other Tools

from Oswego!

We make these famous wrenches from high grade Tool Steel, thoroughly tested, guaranteed, all parts interchangeable with other standard makes of this type of wrench, wood or steel handles.

This is just one of the many Oswego Tools for Contractors, which include Standard Pipe Wrenches, NUTYP Adjustable Vises, Combination Vises, Tube Expanders, Pipe Cutters, Screw Punches and kindred tools.

The standard of superiority and quality for nearly 40 years. All workmanship and materials guaranteed.

Send this coupon for Oswego Catalog illustrating and describing entire line.

Yes, you may quote me on Genuine Oswego Stillson Wrenches and other Oswego Tools.

Name .....

Address .....

THE OSWEGO TOOL CO.
OSWEGO, N. Y.
SINCE 1897

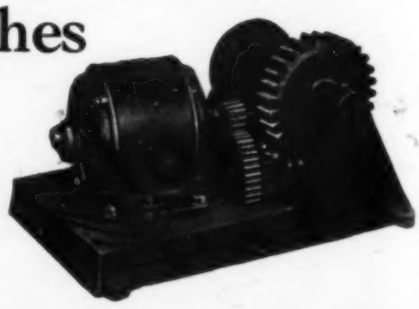
A Dobbie Winch For Every Purpose

From 100 to 50,000 Pounds on a Single Line With Ease and Safety

Large Stock to Choose From

Dobbie Motorized Winches

Sizes 500 to 3000 pounds on a Single Line



DOBBIE FOUNDRY & MACHINE CO.
Niagara Falls, N. Y.

Complete Stock Carried at Niagara Falls and New York City

G. S. GREEN CO., 74 Warren St., New York City
Timber Derrick Fittings—Sheaves—Hand-Winches—Blocks
Write for prices, Dobbie all steel Derricks and Rotating Derricks.

Over 200,000 Yards... Oversize Bucket

A Link-Belt Dragline with 45 ft. boom and 1¼ cu. yd. bucket at work on lake front improvement in Chicago

THE above are the features of the story of service rendered by the Link-Belt K-30 Dragline belonging to Peterson & Simmons, drainage contractors of Fairfax, Missouri.

Under date of January 9, Mr. S. J. Peterson of the above company wrote the following unsolicited testimonial:

"We expect to get through with the job at Elmo, Mo. in about a week if the weather does not get too bad on us. That will make 165,000 yards since October 18.

"This K-30 has dug considerably over 200,000 yards since we got it. It has caused *less trouble than any machine we have had anything to do with.* Nothing has been spent on it except for brake lining."

It should be noted that this 1 cu. yd. machine had been equipped by the owner with a 1¼ yard bucket. This is the fourth Link-Belt machine that Mr. Peterson has purchased.

The range of sizes in Link-Belt Crawlers is up to two full yards capacity, heavy duty units, gasoline, Diesel or electric power.

Send for Book No. 1095

LINK-BELT COMPANY

Builders of Locomotive Cranes for 30 years. Portable Loaders—Crawler Cranes—Shovels—Draglines

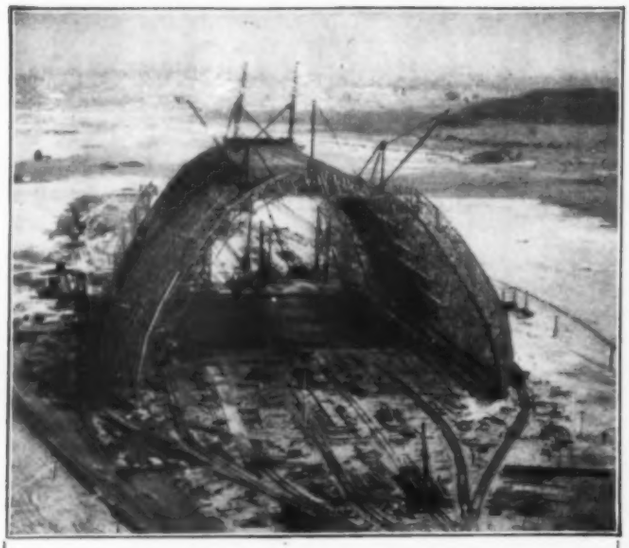
Chicago, 300 W. Pershing Road

Offices in Principal Cities

3912

LINK-BELT

SHOVELS + CRANES + DRAGLINES



Goodyear-Zeppelin Airship Factory and Dock, Akron, Ohio. Concrete work by Clemmer-Noah Construction Co., Akron. Architects, Wilbur Watson and Associates, Cleveland.

The World's Largest Airship Factory and Dock

—a single building, 200 feet high with nine acres of floor, that can hold six miles of standard freight cars—or fourteen football fields.

It would hold the two navy airplane carriers Saratoga and Lexington, the Statue of Liberty and Washington's home all at one time.

Foundations for the middle span go 30 feet to bed rock. Underground concrete girders tie the side foundations together. There are 375,000 sq.yds. of 6 in. concrete floors.

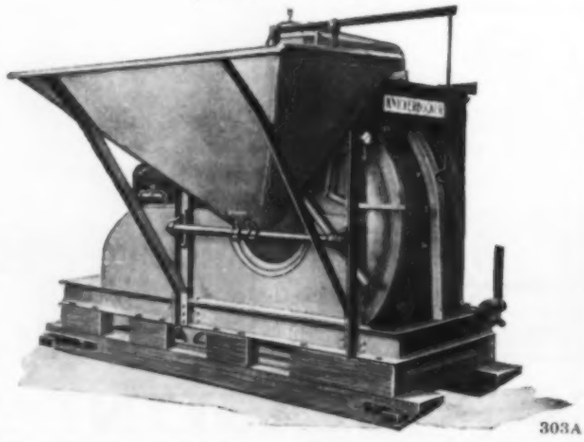
The job of producing and placing what engineers say is the finest concrete ever laid anywhere was intrusted to Clemmer-Noah Construction Co., Akron, a nationally known organization.

The job of mixing the concrete with laboratory precision was intrusted by Clemmer-Noah to a Knickerbocker 1-yard mixer.

On big work where quality concrete is wanted in an uninterrupted stream, use a Knickerbocker.

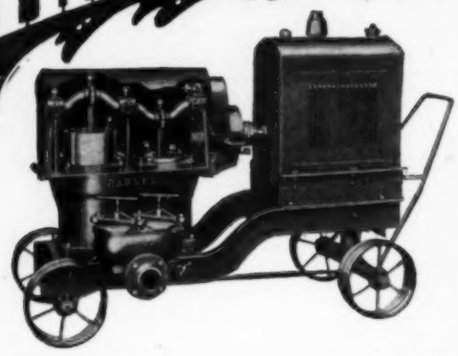
The Knickerbocker Company

Jackson, Michigan



303A

GETS RID OF THE WATER

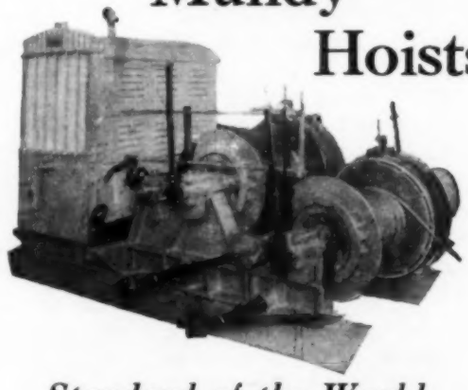


Spill the water at the pump or force it under any head up to 50 feet. No diaphragms to wear out. In continuous operation for weeks at a time on many jobs. Write for full information.

THE BARNES MANUFACTURING CO.
Mansfield, Ohio, U. S. A.

BARNES
PLUNGER TRENCH PUMPS

Mundy Hoists



Standard of the World

Gasoline—Electric—Steam

Built up to a standard
Not down to a price.

Car Pullers—Cableways

J. S. Mundy Hoisting Engine Co.
722 Frelinghuysen Ave., Newark, N. J.

TRADE MARK
MUNDY
ESTABLISHED 1869

Export Office, 30 Church Street, New York City
Cable Address: BROSITES

What's Mine is My Own

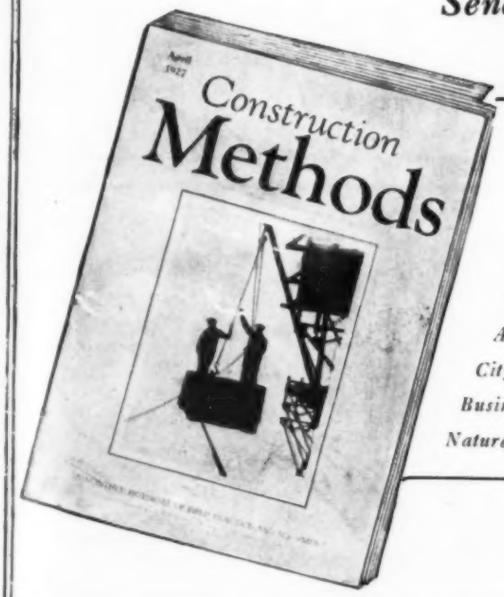
I do with it as I please—when I please—and how I please. I don't have to borrow what's mine—nor must I return it. I share it if I wish—but first and last, it's mine—for my own use.

My copy of *Construction Methods* comes to me regularly each month. It is the field engineer's most valuable means of keeping in touch with the new developments of modern civil engineering and construction. I need it—and I wouldn't be without it. Nor do I want to read it after others have torn out the most interesting articles for their own use. I want the news complete, and I want it while it's new.

When pictures and items are cut or missing—when you see each issue two weeks late, or not at all—when others have used *Construction Methods'* ideas long before you read about them, you are not getting full value, or the help to which you are entitled through this paper.

You need your own copy. Be sure to get it.

Send the Coupon NOW



CONSTRUCTION METHODS
Tenth Ave. at 36th St., New York, N. Y.

Send me my own copy of Construction Methods each month for the next two years. Here's my dollar bill—sent at your risk.

Name .....

Address .....

City ..... *State* .....

Business Connection .....

Nature of Business ..... *Title* .....

FROM GROUND LINE...TO SKY LINE
DE PAUL HOSPITAL, ST. LOUIS, BUILT WITH

Sterling

WHEELBARROWS

By W. J. Lynch Company, Chicago, who know from their experience in using 20 No. 6 Concrete Carts—60 No. 6-A Wheelbarrows and 16 No. 34 Wheelbarrows, on this building, that Sterling Wheelbarrows hold down COSTS—in speed of handling and rugged, dependable performance with least maintenance expense.

The John W. Rowan Plastering Co. also used Sterlings on this job.

STERLING WHEELBARROW COMPANY

STERLING ON A WHEELBARROW MEANS MORE THAN STERLING ON SILVER

MILWAUKEE WISCONSIN

BRANCH OFFICES AND WAREHOUSES—BOSTON, NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, DETROIT, CHICAGO, ST. LOUIS

ATLAS DOUBLE-DUTY MACHINE

Does Work of Grader and Scraper in One Operation

Be low bidder and make larger profits

THE patented Grader-Scraper is a double-duty machine. At little more cost than a scraper, it accomplishes the work of two machines—a grader and a scraper—by application of the plow.

PLOWS BREAK SOIL—Plows control the cut and aid the Grader-Scraper to work efficiently in difficult soils, so a scarifier is seldom needed.

A PROFIT-MAKER—The Grader-Scraper grades, scrapes, fills and moves dirt at a low cost heretofore considered impossible.

Send for Bulletin No. 8, illustrating the Grader-Scraper, giving capacity, specifications and showing character of work it does.

Bulletin No. 9 tells why the Atlas Rotary Wheel Scraper moves dirt at exceedingly low yardage cost.

ATLAS SCRAPER COMPANY

6207 Maywood Ave., Bell, California

Steel and Woven Tapes of all patterns. Folding Aluminum and Steel Rules.

LUFKIN

MEASURING TAPES and RULES

Send for Catalog

THE LUFKIN RULE CO.

Windsor, Ont. SAGINAW, MICH. New York

Spring Joint Rules with or without hook; Boxwood, Caliper, and Extension Rules.

BUILT FOR WORK!

—the WEHR Model U4, equipped with Wehr All-Purpose Wheels is the ideal construction and maintenance unit

Ever since their introduction to the field, Wehr Power Graders have been unquestioned leaders in their ability to perform. This has always been due to advanced engineering ideas and good, honest construction.

The Wehr Model U4 is undoubtedly the most efficient construction and maintenance unit ever built. It has ample strength for the most severe service. It embodies the time-tried Wehr engineering ideas. It possesses the utmost utility for construction and maintenance work, particularly when equipped with Wehr All-Purpose Wheels, which provide sure-footed traction under every conceivable condition.

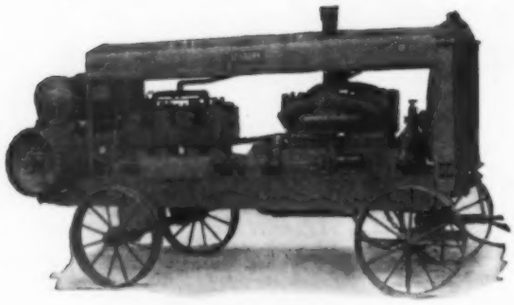
There is no better unit built for highway work, and there is no more profitable unit that a road equipment distributor can handle.

It will pay contractors, township, county and state highway officials to consider the Wehr line of road equipment before making any decision. Complete data will be furnished upon request.

WEHR COMPANY, Milwaukee, Wis.

Factory—Cudahy, Wis.

WEHR
ROAD EQUIPMENT



Keep a Strangle Hold on the Time Limit

CONTRACT dates have a way of creeping forward and becoming due all too soon.

Schramm Compressors have in nearly every phase of construction work proven their excellence by furnishing that unfailing power which is so necessary in completing jobs economically.

A Schramm satisfies the contractor and operator.

Here are some of the reasons for such satisfaction:—

Flexible Clutch Coupling — permits the engine being started free from the compressor load.

Powerful Buda Engine—nationally known for unfailing performance

Simply designed compressor—larger capacity.

Positive pressure control—assuring uniform pressure.

Air tank standard A.S.M.E. riveted.

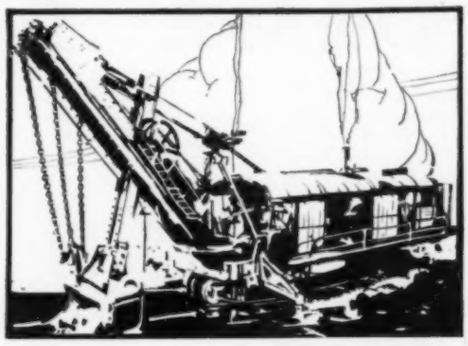
Sizes—1 up to 360 cu. ft. Gas, Electric or belt drive. Truck, trailer, skid or tractor mounted.

Get the Catalog.

SCHRAMM, INC.
West Chester, Pa.

Distributors and Representatives in All Principal Cities

Schramm



There's hardly a place on this shovel where* Dixon's Waterproof Graphite Grease *won't ease severe service

For this lubricant has GRAPHITE as an element. It gives wearing surfaces a remarkable smoothness and protects them.

For gears chains and wire ropes exposed to every climatic condition, Dixon's Waterpoof Graphite Grease not only lubricates, and prevents rust, but adheres to the moving parts at any speed. It is not wasted. It cannot gum—it always protects and lubricates.

There are Dixon Graphite Products for cranes, derricks, dredges, pump plungers, belts, pipe joints—for any type of machine or service—and there is economy in using them.

The quickest way to *know* the facts for yourself is to write for Circular 86-W and samples.

Joseph Dixon Crucible Co.
Established 1827
Jersey City **New Jersey**

In a Champion fighter

it's Punch—

In the WILLIAMS "Champion" Clamshell,

it's Power—

EVERY contractor who has seen the WILLIAMS "Champion" working in hard material has rated it *"an unequalled digger."*

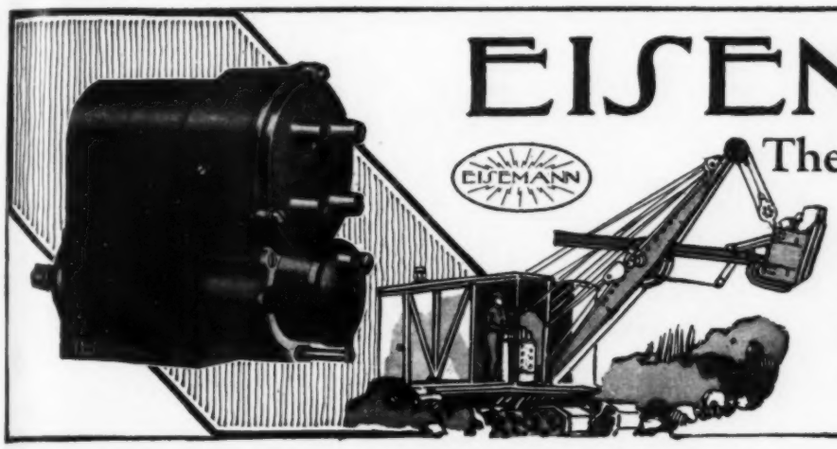
21 improvements give this new WILLIAMS "Champion" greater digging power and speed. It's put on your work with a definite guarantee to *outdig and outlast any other bucket built.*

Write for Bulletin "SP-25".

G. H. WILLIAMS COMPANY
607 Haybarger Lane, Erie, Pa.
Branch Offices: New York, Pittsburgh, Chicago.

WILLIAMS
FAST-DIGGING BUCKETS

149



EISEMANN

The Foremost Magneto

for Construction Equipment

The overwhelming choice of the builders of high quality equipment. Favored by contractors everywhere.

EISEMANN MAGNETO CORPORATION
165 Broadway - New York

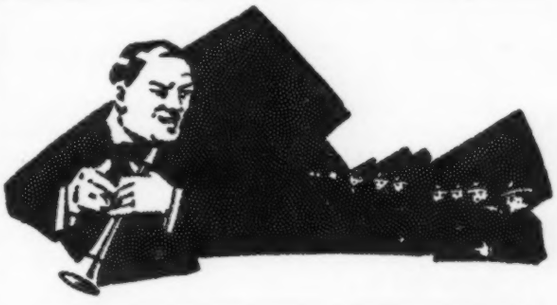
BULL FROG WHEELBARROWS

Always "On the Job"

Bull Frog Wheelbarrows are made in many models to meet every construction need, but they are all alike in their ability to stand up under hard and constant usage. Bull Frog No. 64, shown below, is a long, narrow, deep-tray model particularly adapted for concrete work. Handles either wet or dry materials. Sturdy and well-balanced, it offers many practical advantages in addition to its exclusive Bull Frog "Never-Break" wheel. Send for catalog giving detailed specifications of this and other Bull Frog barrows, carts and scrapers for every contracting and industrial use.

THE TOLEDO WHEELBARROW CO.
TOLEDO, OHIO

Branch Office and Warehouse: CHICAGO—520 W. Erie St.



GETTING ATTENTION

Tooting a horn is one way, Advertising, another. If you have a business want make it known to the other readers of this paper. Reach the whole industry through an ad in the

SEARCHLIGHT SECTION

For Every Business Want
"Think* SEARCHLIGHT *First"

0134

HUMDINGER PUMPS

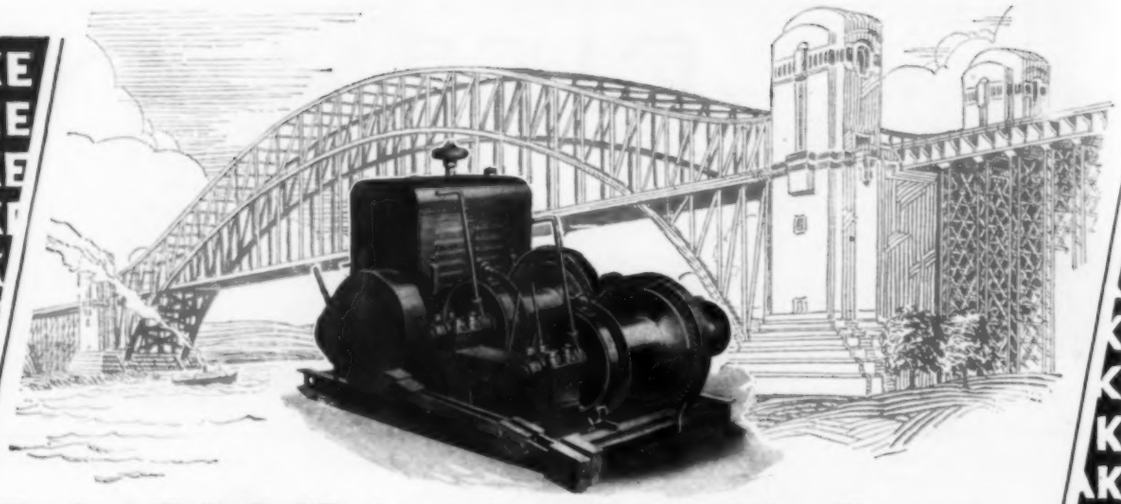
Non-clogging, everlasting rubber ball valves, totally enclosed, running-in-oil jacks, bronze bushed bearings, all steel trucks, and enclosed engine crank cases make HUMDINGER PUMPS.

THE CONTRACTOR'S CHOICE

Full detail description given in Bulletin No. 1034 CM. Send for a copy.

RALPH B. CARTER CO., 53 Park Place, New York
Factory: Hackensack, N. J.

DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE



Dake S-LG Hoists Are Superbly Strong

The famous Hell Gate Bridge which supports a hundred thousand tons of freight every day is constructed almost entirely of structural steel.

Now examine a Dake S-LG Hoist—it, too, is built of structural steel, built to withstand the most severe tests of actual day after day use.

Combining maximum strength with light weight, they give better and longer service. Dake Hoists are powered by either gasoline or electric motors.

It will pay you to examine these Dake Hoists.

DAKE ENGINE COMPANY

Grand Haven Michigan

DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE

No Place Too Cramped for

Watson-Stillman Independent Pump Jacks

They are being used extensively by Underpinning and Foundation Contractors for underpinning work, sinking piles under foundations and making tests of footings.
We make a full line of other types of jacks, and also many hydraulic devices suitable to the contractor's needs, such as concrete testing presses, benders, shears, pumps, punches, valves, tunneling shields, etc.

Write for Catalogs

THE WATSON-STILLMAN CO.
1014 Evening Post Bldg., New York City

Chicago, Philadelphia, Atlanta, Pittsburgh, Richmond, St. Louis, Houston, Cleveland, Detroit

GLOVES *are Important Equipment*

SABIN CO., GLOVES
536-40 W. Federal St., Youngstown, Ohio
Send the information on Sabin Gloves.

Name .....

Address .....

.....

If you wish a pair of No. 209 Gloves enclose $1.50 and check here ( ).

Like poor tools, bare hands or poorly protected hands can't do a full day's work. Contractors and foremen know this—are recommending Sabin Gloves to their men for protection against work and weather.

No. 209 is especially good for Cable Work—cream horse hand and back of fingers to knuckles, gun cut, outside seams protected. It is washable—has Hold-Tight back—only $1.50 a pair.
Welders and Burners will like No. 1110—made for this work.

Send the coupon. Be sure to mention size wanted.

SABIN CO.—*Gloves*
536-40 W. Federal St.
Youngstown, Ohio

SEARCHLIGHT SECTION

EMPLOYMENT—BUSINESS OPPORTUNITIES—EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 5 cents a word, minimum $1.00 an insertion, payable in advance.

Positions Vacant and all other classifications, 10 cents a word, minimum charge $2.00.

Proposals, 50 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals.)

DISPLAYED—RATE PER INCH:

1 inch $7.50
2 to 3 inches..... 7.25 an inch
4 to 7 inches..... 7.00 an inch

An Advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

C.M.

STEEL SHEET PILING

Bought, Sold, Rented.

WEMLINGER INC.

Service, Technical advice, Stocks on hand everywhere.

149 BROADWAY NEW YORK

New "SEARCHLIGHT" Advertisements

must be received by noon, the 3rd of the month to appear in the issue out the 10th of the month.

Address copy to the Searchlight Department

Construction Methods

Tenth Ave. at 36th St., New York City

POSITION VACANT

SUPERINTENDENTS of construction, engaged entirely in heavy construction work, experienced in hydro-electric construction, concrete and earth dams, power houses, rock excavations, etc. If you are open for a position of this description, advertise in the Searchlight Section of Construction Methods. Send your ad to the Searchlight Dept., Tenth Ave. at 36th St., New York.

POSITIONS WANTED

WANTED: If you are in need of Construction Engineers, experienced in superintending, estimating, drafting and purchasing, you should place your need before the live wire readers of Construction Methods. Send your ad today to Searchlight Dept. Construction Methods, Tenth Ave. at 36th St., New York.

CONSTRUCTION superintendents, experienced in concrete arch bridges, difficult foundations, river work, heavy shoring, cofferdams, pile driving, sewage treatment, water purification plants, etc., can readily be obtained through an advertisement in the Searchlight Section of Construction Methods. Send your ad today to Searchlight Dept. Construction Methods, Tenth Ave. at 36th St., New York.

STEEL SHEET PILING

LINDHEIMER — SUCCESSFUL PERFORMANCE FOR ARCHITECT-ENGINEER-BUILDER — SERVICE

Saves you money and trouble in Foundation, Cofferdam, and Sewer work.

Bought-Sold-Rented—Always carried in stock

LONG DISTANCE TELEPHONE: CENTRAL 0491

S·W·LINDHEIMER, Inc

31 South Clarke St. CHICAGO

TO HELP YOU

LOCATE COMPETENT MEN

"Searchlight" Advertising

Employment "Opportunities"

JOBS and MEN—For Plant and Office: Technical, Executive, Operative and Selling: *See "SEARCHLIGHT"*

Equipment "Opportunities"

TO BUY, SELL, RENT and EXCHANGE—Used and Surplus New Equipment and Material—*See "SEARCHLIGHT"*

Business "Opportunities"

OFFERED and WANTED—Contracts, Capital, Plants, Properties, Franchises, Auctions—*See "SEARCHLIGHT"*

Address SEARCHLIGHT DEPT., Tenth Ave. at 36th St., New York

GN-030

ALPHABETICAL INDEX TO ADVERTISERS

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Construction Methods* assumes no responsibility for errors or omissions.

	Page
American Fork & Hoe Co.	112
American Hoist & Derrick	120
American Institute of Steel Constr.	8
American Steel & Wire Co.	20
Atlas Scraper Co.	128
Austin Western Rd. Mchry. Co.	121
Autocar Company	4
Baker Mfg. Co.	104
Barber Asphalt Co.	110
Barber-Greene Co.	18-19
Barnes Mfg. Company	126
Bay City Shovels, Inc.	107
Bethlehem Steel Co.	91
Biggs Boiler Works Co.	99
Blaw-Knox Co.	12
Broderick & Bascom Rope Co.	118
Brown Clutch Co.	97
Browning Crane Co.	103
Bucyrus-Erie Co.	9
Buffalo-Springfield Roller Co.	122
Buhl Company	114
Butler Bin Company	78
Carey Company, Philip	80
Carnegie Steel Co.	16
Carter Co., Ralph B.	131
Caterpillar Tractor Co.	92
Chain Belt Company	76-77
Cleveland Rock Drill Co.	100
Cleveland Tractor Co.	26-27
Clyde Iron Works Sales Co.	6
Colphalt Company of Ohio	86
Concrete Steel Co.	68
Continental Rubber Works	111
Dake Engine Co.	132
Dayton Whirley Co.	95
Dietz Co., R. E.	79
Dixon Crucible Co., Joseph	130
Doddie Fdry. & Mach. Co.	124
Dodge Bros. Corp.	72
Domestic Eng. & Pump Co.	108
Du Pont de Nemours & Co., Inc., E. I.	88-89
Eisemann Magneto Corp.	131
Flintkote Roads, Inc.	90
Flory Mfg. Company, S.	118
Foote Company	108
Fulton Bag & Cotton Mills	116
Fuller & Johnson Mfg. Co.	28
Fundon Hoist & Shovel Co.	116
Gohi Culvert Mfrs. Assn.	73
Goodyear Tire & Rubber	69
Greene-Tweed & Company	113
Haiss Mfg. Company, Geo.	23
Heltzel Steel Form & Iron Co.	104
Hercules Motor Corp.	74
Hercules Co.	75
Hood Rubber Co., Inc.	112
Hughes-Keenan Co.	106
Ingersoll-Rand Company	2nd Cover
Jaeger Machine Co.	110-114
Knickerbocker Co.	126
Kolesch & Co.	122
Lakewood Engineering Co.	7
Lean Company, Roderick	118
LeRoi Company	3
Leschen & Sons Co., A.	13
Lincoln Electric Co.	70
Link-Belt Co.	125
Lowell Wrench Co.	115
Lufkin Rule Company	128
McGraw-Hill Book Co.	100-114
Mahon Company, R. C.	96
Marchant Calculating Machine Co.	98
Metalweld, Inc.	119
Metropolitan Paving Brick Co.	46-47
Mohawk Asphalt Heater Co.	117
Monarch Tractors Corp.	Insert, pages 101-102
Moore Trench Machine Co.	124
Morris Machine Works	116
Mundy Hoisting Engine Co.	126
National Equipment Corp.	14-15
National Steel Fabric Co.	85
Northern Conveyor Co.	25
Northwest Engineering Co.	5
Novo Engine Company	93
Orton Crane & Shovel Co.	123
Osgood Co.	21
Oswego Tool Co.	124
Owen Bucket Co.	11
Oxweld Acetylene Co.	87
Poor, Inc., Frederic H.	17
Ransome Concrete Mchry. Co.	10
Reed-Prentice Corp.	98
Republic Rubber Co.	22
Riddell Co., W. A.	3rd Cover
Roebling's Sons Co., John A.	29
Rogers Brothers Corp.	109
Sabin Company	132
Schramm, Inc.	130
Searchlight Section	133
Sterling Wheelbarrow Co.	128
Sullivan Machinery Co.	94
Texas Company	4th Cover
Thew Shovel Co.	Insert 81 to 84
Thomas Elevator Co.	120
Toledo Pressed Steel Co.	79-106
Toledo Wheelbarrow Co.	131
Truscon Steel Company	122
United Tractor & Equip. Co.	71
Universal Crane Co.	67
Universal Atlas Cement Co.	30
Waldron Corp., John	24
Wappat Gear Works, Inc.	120
Watson-Stillman Co.	132
Wehr Company	129
Western Wheeled Scraper Co.	105
Williams Company, G. H.	130

SEARCHLIGHT SECTION

Classified Advertising

Classifications	Page
EMPLOYMENT	
Positions Vacant	133
Positions Wanted	133
USED AND SURPLUS EQUIPMENT	
Lindheimer, S. W.	133
Wemlinger, Inc.	133

Nowhere Else in All the World

Can you find all these things in a single line of "One-Man" Power Graders:

CHOICE OF CENTER OR REAR CONTROL
THREE SIZES, AND SIX MODELS
OSCILLATING REAR-TYPE CRAWLERS AND RUBBER TIRED WHEELS, INTERCHANGEABLE
I-BEAM FRAMES—"BUILT LIKE A BRIDGE"
HEAD-TYPE STEERING—"STEERS LIKE AN AUTO"
BULLDOZER, SNOW PLOW AND INDEPENDENT SCARIFIER ATTACHMENTS INTERCHANGEABLE ON SAME MACHINE

WARCO, ALONE, GIVES THEM ALL

You need WARCO, the year round machine, for

HEAVY CONSTRUCTION • SPEEDY MAINTENANCE
BUILDING SHOULDERS • CUTTING DITCHES
RESURFACING ROUGH SPOTS • REMOVING SNOW
BULLDOZING • LEVELING • FILLING
and many other road or street jobs

WARCO
BUCYRUS
OHIO

Be fair to yourself and investigate WARCO thoroughly before you buy road machinery

W. A. Riddell Company BUCYRUS OHIO

POWER AND DRAWN GRADERS, WHEELED SCOOPS, REAR-TYPE CRAWLERS

DETROIT PUBLIC LIBRARY
DETROIT
MICH

every day . . .

50,000 vehicles use this TEXACO ASPHALT pavement

Few pavements in this country—or anywhere else in the world—can boast a *daily* traffic of fifty thousand vehicles. The impact of fifty thousand vehicles day after day, and year after year, is the surest test of an asphalt's ruggedness and durability.

The TEXACO Sheet Asphalt pavement on the Dallas-Oak Cliff Viaduct, Texas, is one of the few pavements carrying this exceptional traffic every twenty-four hours. Although the pavement has been in service since 1922, there are no patches in it today.

During the past quarter of a century, paving contractors have constructed TEXACO Asphalt streets in 1460 American cities and towns.

TEXACO ASPHALT

New York
Philadelphia
Richmond
Boston
Jacksonville

The Texas Company
ASPHALT SALES DEPT.
17 Battery Place, New York City

Chicago
Cleveland
Kansas City
Houston
Dallas
Buffalo